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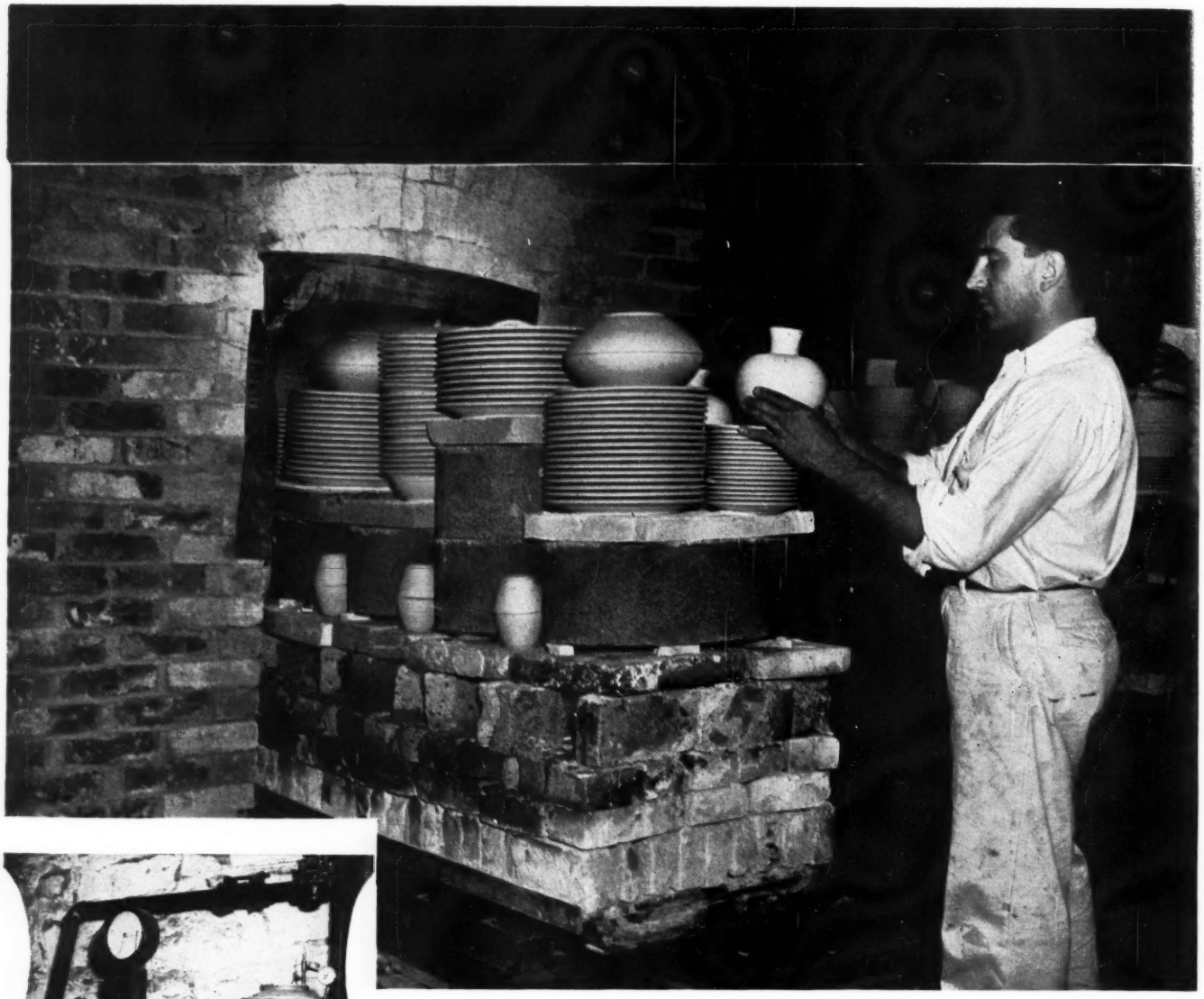

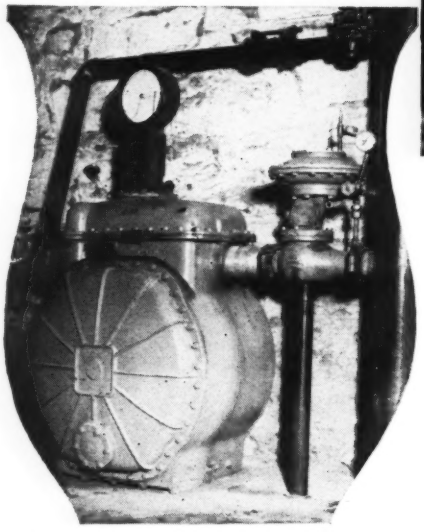

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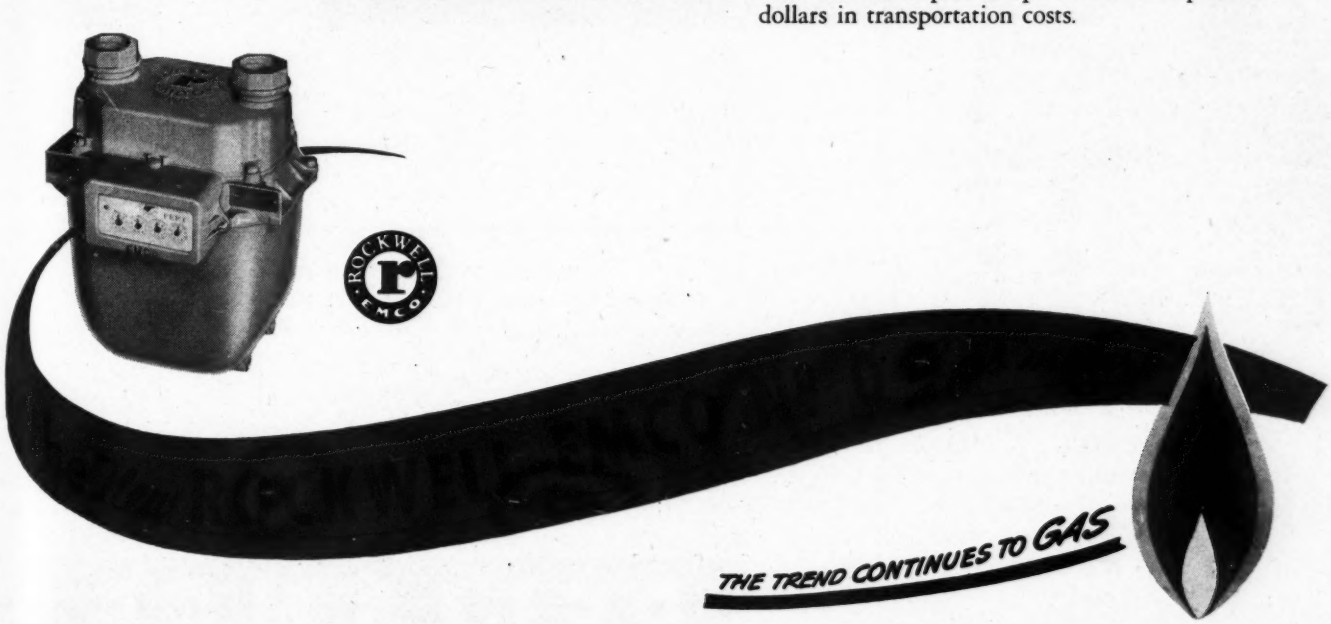

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Twenty-Second Year of Publication

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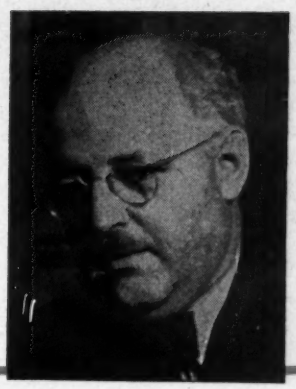
THERMALLY THINKING

By ELLIOTT TAYLOR, Editorial Director



The Crucial Test

WITH the close of the Chicago hearings the total pages of transcript of testimony before the Federal Power Commission in its Docket G-580 natural gas investigations ran to 7686 pages. Of this, the Chicago meetings alone accounted for 2443 pages when the 109 witnesses who appeared had all completed their presentations. In addition to the nearly 8000 pages of hearings testimony, there had been accumulated 279 exhibits, ranging from pamphlets and maps to treatises that were almost book length in their amplitude.

At the present writing there is still a short session at Charleston, W. Va., scheduled to be concluded early in April, following which the proceedings will move into Washington, D. C., for what is now expected to be the summarizing and final analysis of all that has been heard to date. The date of the Washington opening has been postponed from May, and will not open until June 17.

The Washington hearings have been more or less accepted by the natural gas industry as well as by its adversaries, the natural gas obstructionists, as the arena in which the final battle of the fuel ideologies will be joined.

Reduced to simplest terms, the debate will center around the question of whether more or less federal control over natural gas will be productive of the greatest benefits to the public at large. This public benefit in no sense will, or can, be narrowed down to mean just the interests of gas consumers, much less of only domestic gas users. While most regulation has ostensibly aimed at the protection of the rights and interests of domestic customers first, it has never been lost sight of, even by the FPC, that there are other and corollary considerations that cannot be ignored. Public convenience and necessity in its broadest sense means not only the right to have gas to boil a breakfast egg; it also means the right to have it under certain conditions, to anneal a spring or fire a kiln. And it must also imply the right of the producer to send his gas to the market that demands it.

Quite apart from the public convenience considerations, two mutually exclusive positions are developing out of the hearings: The gas industry wants no interference with any of its existing rights, either in respect to production and gathering of gas, or its end-use; the coal industry wants no further gas extensions, either in expanded transmission capacities or service into new areas, where that expansion or extension will in any way interfere with an existing coal market. As is the case in any controversy of this kind, each side recognizes that it will have to settle for less than its full demands.

By the very nature of things, the coal interests are and will remain proponents of the theory of greater federal regulation over natural gas matters. They believe that their own economic position will be buttressed by any agency that erects an arbitrary and artificial barrier in the path of natural gas expansion. The fact that at the time of the Washington hearings the soft coal people may be embroiled in their biennial coal strike is not likely to dampen the obstructionist ardor of their general staff.

If we are correct in the assumption that the whole Docket G-580 investigation is envisioned by the FPC as a net to draw in evidence in support of its contention that it needs more authority than was specifically given it under the Natural Gas Act, and that the disposition of the Commission will always be to use that authority to impose restrictions on natural gas expansion, then it must follow that both the coal interests and the Commission, are at least for the moment, in an alliance against the entire gas industry, from the producers through to the local public utilities. Except for the isolated case of the State of Louisiana, and a few gas producers who have had unsatisfactory treatment at the hands of natural gas pipe line companies, the coal-railroad-Federal Power coalition stands alone in its advocacy of stronger centralized control through federal regulation.

Normally allied with the natural gas position, on the other hand, are: the majority of the gas producing states, backed by their local regulatory bodies; the gas producers and royalty owners; the petroleum industry; gas pipe line companies; the commercial and industrial consumers of gas; municipalities whose local economies are geared to high fuel demands and the distributing gas utilities themselves.

It should be noted that the ultimate goal of many of these temporary allies is not by any means the same. The gas producers want higher prices for their gas, and a free and untrammeled market in which to sell it. The consumers want gas at the lowest price possible and in any quantities required on demand. The state regulatory bodies, while they oppose federal regulation, do not do so on the grounds of any opposition to regulation *per se*. They merely say that where regulation is needed, they can do it better. Even the interests of the two most closely identified factors, the natural gas transmission companies and the distributing utilities, are far from being identical on every count. The lively furror kicked up between the Panhandle Eastern Pipe Line Co. and its wholesale customer, the Michigan Consolidated Gas Co., over the former's proposal to sell natural gas direct to the Ford Motor Co. amply illustrates that point. Here the pipe line company's application was opposed before the FPC by the City of Detroit and Wayne County, Mich., as well as by the Michigan Consolidated Gas Co. To gain the end that they sought, namely the limitation of a specific

end-use of natural gas in one case, these latter interests who normally would be in opposition to increased federal control, actually sought the aid of the federal agency.

Since the position of the FPC cannot be one of judicial impartiality where its own prerogatives and powers are at issue, it is obvious that it would be a futile exercise for the natural gas industry to attempt to sum up the testimony with a view to impressing the Commission. The sum total of the findings are inevitably destined for review and consideration before a higher tribunal in the form of a special Congressional committee.

With this in view, we believe the Natural Gas Industry Committee would do well to abandon any lingering hopes it may have entertained of persuading the FPC that it already has sufficient jurisdiction over natural gas matters to do a much better regulatory job than it has done to date. In fact, we believe that a legitimate part of any industry presentation would be a compilation of the patent sins of omission by the Commission, most notably a categorical analysis of its failure to define service areas, with competent legal analysis of its piecemeal progress into fields of authority not given by the Natural Gas Act.

The lamentable and periodically demonstrated inability of the coal industry to keep its own house in order should also be presented. Any group that blandly demands the interruption of normal economic laws so that its markets may be preserved intact should be able to demonstrate its ability to serve those markets at all times and under any circumstances.

The attacks on the effectiveness of state measures to prevent waste, made during cross examination at the various field hearings, should be refuted by the gas industry with its own statistics and other corroborative evidence. If the industry is sincere in its assertion that state control is all that is needed, then it must demonstrate that sincerity by backing up the state authorities in their contentions which are to the same effect.

Summing up the testimony will be a crucial test of the ability of the natural gas industry to think objectively, to support its friends and discredit its enemies, and to state a categorical position that for better or for worse will be looked upon as the industry's official view of the FPC findings and their final interpretation.

The Science of Common Sense

THERE is a growing tendency, in these modern times, to attempt to fit into the frame of an exact science many of the activities and the incidentals to doing business that once were the prerogative, the occupation and the pride of any competent run-of-the-mill management.

Once such an activity becomes a "science"—and science with quotes around it means that as far as the author is concerned its scientific status is still in doubt—it attracts to itself a course or two at the progressive well-rated colleges and universities. Then, having been given the accolade of the academic nod, it begins to attract to itself new practitioners. They are the new experts who rapidly develop a patois of their own—a new and esoteric language that is only vaguely meaningful to the rest of the working world.

We were forcibly reminded of this during a recent meeting of the New England Gas Association held in Boston. There, most of the afternoon session of the closing day of the convention was devoted to a labor relations forum, the first of its kind to be sponsored by the gas operators in that rugged and individualistic area. And most impressive of all was the fact that of all the sessions scheduled for the two-day meeting, this one commanded and held, until the last rap of the gavel, the attention and interest of the greatest number of listeners.

Here in the impressive omniscience of their college and university background sat professors and associate professors from Harvard, from Boston University and from M.I.T., answering questions on labor relations put to them almost humbly, and in deepest sincerity by executives of the New England gas industry.

But after all of the questions had been asked, and all of the answers had been given, we were impressed by the fact that textbook and theory notwithstanding, labor relations are still governed by the most adaptable, yet the most inviolable rule of all, that of plain common sense.

Common sense and good will on the part of both employers and employees have been responsible more than any other single factor for the record of labor stability that has become traditional in the gas utility industry. In any industry at all, where elaborate and cumbersome safeguards of employees' rights have been written into union contracts, the genesis of such safeguards can generally be traced back to management practices that made them necessary, practices from which common sense and good will were conspicuously missing.

Does management complain that a seniority clause in a union contract tends to set a low value on individual initiative and efficiency? Then the bargaining agency for labor counters that in the past favoritism and individual submission to exploitation have been the all too predominant standards. The common sense answer is that both length of service and individual merit should be taken into account in awarding promotions and increased pay. That is the common sense answer; and in Boston it turned out that it was the academic answer as well.

How can disputes with organized groups be settled without recourse to compulsory arbitration? The best method of settling any dispute is by consultation and exchange of views between the interested parties. If that fails, then an impartial authority from outside, whose judgment and integrity are held in high esteem by both sides, may be consulted. Devoid of technical terms, that has long been the method employed in industry, and it is the method that the professors themselves recommend.

Proposed changes in compensation—should they be discussed in advance with the employees? Common sense says yes. And so do the textbooks. Should wages in any local gas plant be governed by those prevailing throughout the industry, or by prevailing wages in the town or city in which the plant is located? Common sense dictates that industry skill, which would be a criterion of what an employee could earn at the same job with another gas company must be taken into consideration, but so also must be the prevailing wages for alternative employment that he might be able to obtain with another industry in the same area. And that answer sums up about all that the panel of professors or anybody else was able to contribute.

We believe that the labor relations forum was a valuable experience for the members of the New England Gas Association. We believe that similar forums would be worth while for every employer group. But we believe also that whenever management finds itself confronted with a labor relations problem, and no textbook on the subject handy, common sense and good will can continue to serve in remarkably good stead until some new and better rules are devised.

Highlights

• The Washington, D. C., hearings in the Federal Power Commission's Docket G-580 investigation of natural gas matters have been postponed for a month, and are now scheduled to open in the Capitol on June 17. It is expected that the coal and railroad interests who to date have appeared only through their attorneys' cross examination of witnesses, will take this opportunity to present publicly their views on federal policy regarding fuel regulation.

• If a long drawn out soft coal strike develops there is a definite danger of a manufactured gas shortage in the Atlantic area. It is probable that this in turn would result in demands for an immediate clarification of official policy regarding the conversion of the Big Inch lines to the transportation of natural gas. It may well influence Congress to repudiate the Surplus Property Administrator's recommendation that the lines be continued in oil service.

• In refusing the Panhandle Eastern Pipe Line Company permission to sell gas direct to the Ford Motor Company in Detroit, the FPC has introduced a new justification for an end-use decision. It now implies that it is the Commission's responsibility to see that a natural gas company, under the act, does nothing to impair the adequacy of gas supply to existing customers. Should the Commission deem it prudent to reverse its decision in the Boone, Iowa, case, where service was denied on the grounds of possible economic injury to the coal interests, it will now have a backlog of another, and apparently more defensible, position, on which to base future declarations.

• The Petroleum Administration for War will be terminated April 30, according to an announcement from Acting Petroleum Administrator Ralph K. Davies, who has asked for an Executive Order to accomplish the final liquidation. Davies received the Medal for Merit Award from President Truman on December 7, 1945 for his war service in oil.

• An effort to conserve gas and oil in Louisiana will be made by industry representatives who have agreed to form a joint committee with the state minerals authorities under the auspices of the Louisiana Conservation Commission to work on a plan for prorating gas production.

• The Southern California and Southern Counties Gas companies have asked the California Railroad Commission for authority to increase the size of the Texas-to-California line from 26 to 30 in., upping the capacity from 305 to 400 MMcf daily. El Paso Natural would receive $250,000 annually for the increased pressures. Final hearings before the FPC were scheduled for April 8 in Los Angeles.

• P. A. Frye, executive director of conservation of natural gas for Louisiana, has recommended that the state gathering tax be raised from ½c to 3c per Mcf in an effort to prevent the transportation of gas from Louisiana to areas where coal is available. He proposes that the tax be paid by the gatherer rather than the land or royalty owner. Other Frye proposals: (1) that natural gas lines be declared public utilities and place for intrastate operation under the Louisiana Public Service Commission; (2) statewide gas proration; (3) prevention of use of gas for gas lift followed by venting; (4) reduction of the gas-oil ratio with an upper limit of 5 Mcf instead of 15 Mcf; (5) increased cycling of all gas condensate fields.

• The Liquefied Petroleum Gas Association has appointed two full time officials and opened new national offices at 11 South La Salle Street, Room 1130, Chicago. Howard D. White has been named executive vice president while Franklin R. Fetherston, former secretary and treasurer of the Association, will have the office of vice president, technical division.

• The Food Service Equipment Committee of the Industrial and Commercial Gas Section, A.G.A., under Chairman Leo Ourusoff has launched a long-range program in the interests of commercial cooking and baking. Objectives: (1) a unified sales promotional program; (2) a sales training program; (3) appliance upgrading; (4) unity of action with manufacturers.

• Robert Suttle, former University of Texas faculty member and for 14 years active in the management engineering utilities business, has been named managing director of the Southern Gas Association. Dean A. Strickland, sales manager for United Gas Corp., Houston, was named president of the Association at the March meeting.

• The petition of the Independent Natural Gas Association of America to intervene in the rehearing of the Northern Natural Gas Co. case in which the utility's application to furnish boiler fuel gas to Iowa Electric Light and Power Co., has been approved by the FPC.

• The Supreme Court April 1 upheld the constitutionality of the "death sentence" clause of the Public Utility Holding Company Act which requires interstate gas and electric holding companies to limit their operations to a single, integrated system. The court ruled on an appeal by North American Co. from an order by SEC directing it to confine its activities to a system in the St. Louis area.

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should be required to be by industry ukase.

Reduced to the stark essentials of self interest only, the gas utilities might well urge that the appliance manufacturers be required to incorporate features and refinements that would be impractical from a competitive and marketing point of view. Any utility sales manager worth his salt dreams of the day when he will be able to offer cooking equipment, let us say, or any other type of gas appliance, that will out-perform, outglamorize, out-intrigue and out-sell anything that the purveyor of any competing fuel can ever hope to offer. And he wants to be able to sell it at a price that will keep gas in the forefront of favor with the great mass market, the people of moderate or less than moderate means who are the prime objective of every big scale selling campaign. Not infrequently, through its intimate contact with the gas consuming public, which is its customer, a utility may become firmly wedded to the conclusion that only it is capable through this contact to indicate in advance just what that public will buy.

The Manufacturers Interest

Manufacturers of equipment, on the other hand have an interest of their own in what should be made and who will be most likely to buy and for how much. Few indeed of the present leaders in the gas appliance field won their first acceptance on the deluxe or super-quality models. Through years of experience, manufacturers too have become remarkably proficient in sensing what the public will buy. Most of them are experienced in cultivating both the quality market and the medium and low priced fields as well. They regard with understandable suspicion any suggestion that they feel may tend to load their output with unnecessary costs that will lower the margin of profit without creating a corresponding increase in volume.

It is to reconcile these two different viewpoints, viewpoints that often tend naturally to lead their proponents to seek different paths to the same goal, that the procedure for originating, developing and passing on approval and listing of appliances was developed.

An early definition of the A.G.A. Laboratories' testing program divides that activity into two parts, approval and listing. "Complete approval implies compliance with the requirements under which the appliance was tested and is applied only to complete self-contained gas-burning equipment such as gas ranges, water heaters, etc. Listing applies to those accessories for which listing requirements have been adopted and is awarded to those items which contribute to a complete gas-burning appliance, but which may depend on either the appliance to which they are attached, or their manner of installation, or both for satisfactory performance. The two programs are interrelated to the extent that most approval requirements call for the use of listed accessories or for accessories that will comply with listing requirements."

The Present Plan

Shortly before the outbreak of the war, on the analysis and recommendations of an American Gas Association committee, and a committee representing manufacturers who are members of the Gas Appliance Manufacturers Association, the method of procedure in the development of appliance approval requirements was completely overhauled and made the subject of joint action by the two associations.

The plan was devised to provide opportunity and incentive for a more active participation and interest in laboratory affairs on the part of the manufacturers. It set up a system whereby every segment of manufacturing interest was represented in one or another subcommittee of approval requirements for its own particular specialty. Thus, there are now subcommittees for every conceivable appliance, from the more obvious ones such as domestic gas ranges, gas water heaters, and central heating appliances, down to one covering approval requirements for gas heated ironers. At the present time there are 29 such subcommittees, all manufacturer members of which are drawn from the ranks of the GAMA. Every subcommittee, in addition to its manufacturer members, has an equal number of representatives from gas utilities.

At the top of the heap, over all of the various subcommittees, is the governing body, named the American Standards Association Sectional Committee, Project Z 21, American Gas Association Approval Requirements Committee. This committee is generally referred to as the Approval Requirements Committee. It is composed of eight gas company, eight GAMA manufacturer representatives and 10 additional members representing government and consumer agencies. The activity of the American Standards Association in the scheme is more or less nominal, since it is from the various industry groups, of which the gas industry is only one, that it receives and incorporates, in its American Standards, the details of the requirement that become part of the latter code.

The flow chart (Fig. 1) illustrates graphically how changes in requirements originate, move through various stages of discussion, experimentation, consideration by both manufacturers and gas companies, finally to emerge either as disapproved suggestions or as approved requirements.

In actual practice, most requirements have originated within the gas industry although suggestions are invited and considered from any outside source. Not only the gas utilities and gas appliance manufacturers are included in the field from which suggestions may be drawn, but gas consumers as well may make recommendations that they believe would make for improved utilization of gas equipment.

The channel followed by new suggestions takes them first through the main Approval Requirements Committee, which at this point, merely passes them along to the interested approval requirements subcommittee. Here the changes may be approved, disapproved or discussed and action deferred. In the case of disapproval it is general practice for changes to be recommended.

Research Program

The technical feasibility of approved changes is then explored through research conducted at the laboratories of the A.G.A. and the findings here are referred back to the subcommittee for study.

From the subcommittee they then go out in temporary form to all manufacturers interested, for comment and criticism. This phase of the consideration is more concerned with the commercial and marketing implications of the proposals. It is here that the manufacturers are called upon to study the costs, consider the effect on the competitive position and explore the production practicability of the new requirement. The criticisms and recommendations of gas companies and manuafcturers are then given final consideration by the requirements subcommitee. Thence, in form of that committees' recommendation, they move back to the main Approval Requirements Committee, thence to the executive board of the A.G.A. As sponsor of Project Z 21, this board approves the standards, recommends them to the American Standards Association, whence they emerge in final

form as American Standards for the appliances or equipment in question.

From the time these requirements are published in final form, the manufacturers have approximately a year and a half to adapt their existing models to the new requirements.

Over the years, the Laboratory Approval Seal has gained increasing recognition and acceptance from both the manufacturers of appliances and the consuming public. In its 1945 report, the Laboratory was able to make the truly remarkable claim that "At the present time more than 95% of all gas-burning appliances on the market, including ranges, water heaters, refrigerators, space heaters, boilers and furnaces comply with the American Standard requirements sponsored by the American Gas Association."

There are now and probably always will be, differences of opinion between manufacturers and gas companies as to the proper scope and limits of the Laboratories' function. Utilities observing what they have often regarded as an undue reluctance on the part of appliance makers to adopt many of the new ideas that are constantly being showered down on them from gas sales departments, are wont to urge that all approval requirements be made more rigid, that standards of quality and even of convenience be made mandatory in the interest of better and more salable gas appliances. They have at times voiced the belief that research has run far ahead of the appliance industry's capacity or willingness to apply that research and its findings, to new and improved models for the sales floor and display room.

Manufacturers on the other hand, feel that they are obliged to be on guard against what they fear may become an accelerating trend to make standards too elaborate and too complex for practical compliance. They argue that minimum safety standards should be the major preoccupation of industry approval, leaving the development of new refinements and so called plus values to the appliance and equipment builders, which do not want to be unduly restricted in the application of a later art. They must, in the final analysis, temper their enthusiasm for all of the improvements that are theoretically desirable, with an occasional blast of the cold wind of practical marketability. They contend that, they too, can dream up gadgets ad infinitum, make new models and incorporate changes every year, but they have first and foremost to consider whether or not the buying public will pay for all of the boons that can thus be offered.

Yet, in the final analysis, it is safe to say that the principle of laboratory approval has become so much an accepted factor in the gas appliance business that nothing short of a business and industrial cataclysm could completely uproot and eliminate it from the scene.

Manufacturers realize that they are free to sell their entire output, if they so desire, without the slightest reference to A.G.A. approval, yet the number who do so are so few as to be almost negligible.

The increasing public recognition of the superiority of gas as a fuel has undoubtedly been associated with, and come about through, the development of superior appliances in which to consume it. Whether higher standards are the result of stricter requirements, or whether approval requirements are elevated to conform with improved models of equipment, matters very little, since it is the public that gains. The public gains because it is able to buy a product that is identified as conforming to ever higher standards, democratically arrived at, by an industry that over 20 years ago decided that it could best be regulated by regulating itself.

To paraphrase a popular automobile manufacturer's slogan, we might well say that when better gas appliances are built, the laboratory will label them, with the blue star seal of approval.

Novel Wiring Setup for Tabulator Accounting Machine

JAMES SHAW, supervisor of billing and accounts receivable control, Boston Consolidated Gas Co., recently won $50 as a cash award for a profitable suggestion made to his company. Shaw conceived the idea that if the wiring setup of the tabulator accounting machine was rearranged to use added circuits and controls, more cards could be fed into the machine at one time and handled more easily.

Bill stubs or coupons representing cash paid by customers and made up into bundles by the mailing room, district offices and pay stations, are received daily by the customers' accounting section. After posting to the customers ledger is completed, the bundles and corresponding tabulating cards are sent to the tabulating machine section.

Machine operators would feed each bundle of cards into the tabulator to create a printed total for the amount, indicated bundle number and card count for the group. Tabulated totals were checked to the adding machine tape attached to each bundle and correct card bundles gang punched with the bundle number and paid date. Incorrect bundles were returned for reposting. Reposted bundles were tabulated until the correction was definitely established.

Average production for one tabulator and attached gang punch was 3000 cards per hour for an operator. The machine has a rated continuous capacity of 7200 cards an hour.

The first objective was to reduce as much as possible the difference between the actual performance and the rated capacity of the machine. This was accomplished when a method was found for wiring the tabulator using a controlling circuit not usually employed. This enables the tabulator to maintain almost continuous operation for as many bundles of cards as the feed mechanism will hold (about 600 cards).

Next step was to simplify the visual check between bundle total and tabulated total. The master card used for gang punching bundle number and paid date information was in addition punched in the amount filed for the total amount of the bundle. The master card total registers in the tabulator counter as a credit from which the following detail cards subtract to a zero balance when the posting is correct. Incorrect posting prints the exact amount short as a credit and debit as over. Simultaneously the correct bundle total, card count, and number is printed by other counters.

A summary of the benefits obtained by the above changes are as follows:

1. Two tabulators and gang punches can be efficiently operated by one check at the same time, due to the longer periods of time the machine operates without requiring attention.

2. A recent count of cards tabulated using the new routine gave a total of 10,758 for the first hour or a gain of better than 350% over the original 3000.

3. A grand total of all bundles tabulated for the day is listed from the master cards for a check against the daily total cash receipts. Missing bundles can be quickly located from this register.

4. No additional equipment was used in changing this routine.

GAS-OIL BURNERS

Their Application, Selection and Advantages

By OTTO LUTHERER

Chief Engineer, The North American Manufacturing Co., Cleveland, Ohio

THE expression "gas-oil burner" or more often, "combination burner," applies to combustion equipment which facilitates the burning of two fuels, namely, gas and oil, on the same furnace, either separately or simultaneously. It also implies that the operator of such equipment in accordance with his own judgment, or in accordance with circumstances perhaps beyond his control, is in a position either to choose a fuel which he believes best suited for the process, or to change from one fuel to another if the continuous use of the fuel with which he started might result in unsatisfactory furnace operation.

The advantage of this additional increase in freedom of fuel selection and addition of assurance of being able to carry on the heating process, even if an interruption in the supply of one of the fuels should occur, seems quite obvious. With this in mind, many users of industrial heating equipment have asked for gas-oil burners many years before acute fuel shortages and difficulties with obtaining one fuel or another were experienced, as during the recent emergency years.

Boiler Applications

The only equipment that could really be termed "combination equipment" did not come into use until rather recently. Most applications were on large furnaces, especially boilers, where performance and control were less exacting and where often a gas-oil burner was produced by adding together a crude gas burner and a crude oil burner.

Everyone is agreed that there is no simpler fuel to burn or control than gas and that there are practically no limitations to its use. If only the required amount of oxygen is added in the form of a sufficient quantity of air, the combustion of gas may be carried out to be fast or slow within the limits of flame propagation and depending on the results to be achieved. Small fires and low Btu releases are just as simple to obtain and to control as large fires and high heat releases without the use of any external combustion aids and without any narrow limitations on the size, shape or conditions of the combustion chamber. Most gases are clean and their flows controlled by orifices or made directly subject to the amount of combustion air flowing into the furnace.

Fuel oils require a very much different treatment and have to be "encouraged" to burn before they are satisfied with a mere addition of combustion air. This "encouraging" consists of various methods of atomization, which means changing the liquid fuel into an oil vapor and is ordinarily accomplished by the use of medium pressure air, high pressure air or steam and by the utilization of the energy in high oil pressures. The choice of these atomizing agents depends on the type of oil used, on the type of application and the availability of these means. Medium pressure air is probably the most common one and is used extensively in all gas-oil burners where turndown and control are of importance.

The vapor formed by atomization can then be burned in the presence of hot surfaces, often giving a lot of trouble as long as the settings are cold and usually requiring an excess of combustion air. Many difficulties result from poor atomization and burner instability, causing the formation of solid carbon in the burner tiles and of smoke due to either unburned carbon particles or unburned vapor. Besides this necessity of atomization, most industrial oils also require preheating and temperature controls in order to maintain low enough viscosities. Especially at small flows almost unavoidable changes in viscosity and impurities in the oil give rise to clogging of control valves and thereby make reasonable flow control difficult to obtain.

Fuel oils also burn considerably slower and show correspondingly more flame length, calling for greater combustion chamber length, etc., than those required for the combustion of gas. This fact should be recognized when combination burners are to be used and has some bearing on whether such burners are practical for any one job or not.

Application of the Burner

Many processes cannot be fired with gas-oil burners, since they cannot be fired successfully with straight oil burners, while others might be made applicable only by making changes in the existing furnace. Generally speaking, in a list of jobs unsuitable for gas-oil burners would appear all small fires, open or chambered, below 40,000 Btu's per hour using distillate oil and 150,000 Btu's per hour per burner using residue oil. These values are the lowest turndown figures obtainable, which even at a Btu turndown of 3 to 1 make sizeable fires when operated at normal capacities.

Such a list would also include all low temperature applications, whether periodic or continuous, below 800° F; all installations calling for automatic operation in tight combustion chambers, especially those demanding automatic relight in cold settings; all installations where the presence of sulphur in the flue gases will affect the product; and all jobs installed in surroundings in which there are even occasional oil fumes and smoke cannot be tolerated. It may also be well to mention furnaces which can be operated successfully only by main-

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GAS-OIL BURNERS are being installed in increasing numbers in such industrial installations as forges, boilers, pottery kilns, and heat treating, billet heating, and muffle type enameling furnaces. The advantages of this burner are several in that it permits choice of fuel, alternating use of fuel, or simultaneous use of gas and oil where a particular heating process calls for such flexibility to get best results. In addition, perhaps its greatest advantage is that it allows continued operation when either fuel becomes unavailable. In this article Mr. Lutherer discusses the applications, the advantages, and the selection of this dual fuel burner for particular processes. His paper was presented before the American Gas Association's Sales Conference on Industrial and Commercial Gas held March 29 and 30 at Toledo, Ohio.

taining fairly accurate furnace atmospheres.

While this list seems of impressive length, a large number of applications does exist where gas-oil burners fit in very well. Many installations have been made where the heating process can be carried out successfully with either fuel or even with a combination of both fuels and where each mode of firing represents either a definite economic advantages or fulfills a necessity.

Use Is Increasing

Gas-oil burners are being installed in increasing numbers in such industrial furnaces as forges, heat treating, billet heating, boilers and in muffle type enameling furnaces and pottery kilns. Most furnaces of these types have large combustion chambers and are therefore capable of accommodating oil combustion without the necessity of making any changes in the physical setup. Using gas-oil burners of the right type, it is possible to obtain good heat distribution with either fuel and it has been found that liquid fuel furnace atmospheres at times have some advantages even though their fuel-air ratio may not be controlled as well as those of gaseous fuels.

Once the fact has been established that a given job can be fired with either gas or oil and the customer understands the differences between the two fuels, especially in the handling and preparation of the liquid fuel, the advantages to the user become rather obvious. Using gas-oil burners, it is now possible to choose whichever fuel seems to give the best results for any particular process and to change quickly if a different material passing through the furnace calls for different conditions. Even on the same material it may often be found advantageous to use one fuel for bring-up purposes and another one for finishing.

As an example, a batch type process might call for a large amount of fuel to be brought to temperament without the need of good control or particular furnace atmosphere, while requiring just the opposite during the finishing period. Oil is often used during the initial stages of the process, while gas is called upon at the finish. Conversely, some otherwise oil-fired processes are often started with gas in order to bring the furnace temperature up quickly and to reduce the total process time required, since gas is often able to do this quickly due to its much greater stability even in cold furnaces.

The greatest advantage of two-fuel firing and control equipment, however, lies in the ability to maintain furnace operation when one or the other of the fuels becomes unavailable either momentarily or over a protracted length of time. Many so-called non-essential users of fuel during the war emergency, such as those firing pottery kilns, found themselves suddenly confronted with the necessity of installing expensive gas producers in order to maintain operation of their gas-fired kilns and were glad to find that gas-oil combination burners could be built that successfully kept their kilns in operation when their gas supply was shut off.

Installation of gas producers by these people would have made it necessary for them to continue on producer gas for some time in order to amortize the expensive equipment. During the same period of time many gas-oil installations were made, because often prior to the final installation of the equipment, it was uncertain which fuel would be available. In many cases the eventual user also wanted to be prepared to make a change from the fuel allocated to him to one which he might prefer later on without having to change the firing equipment.

Peak Load Advantage

Perhaps the most important advantage of gas-oil burners lies in the ability of the customer to buy gas on the so-called interruptible schedule. Many localities have sufficient gas during the greater part of the year and gas companies will sell such gas under various arrangements and at various prices. Some contracts call for the use of gas for 6 months, some for 8 months out of a year and some for the year around service, except for a few days on which the service is either decreased or discontinued en-

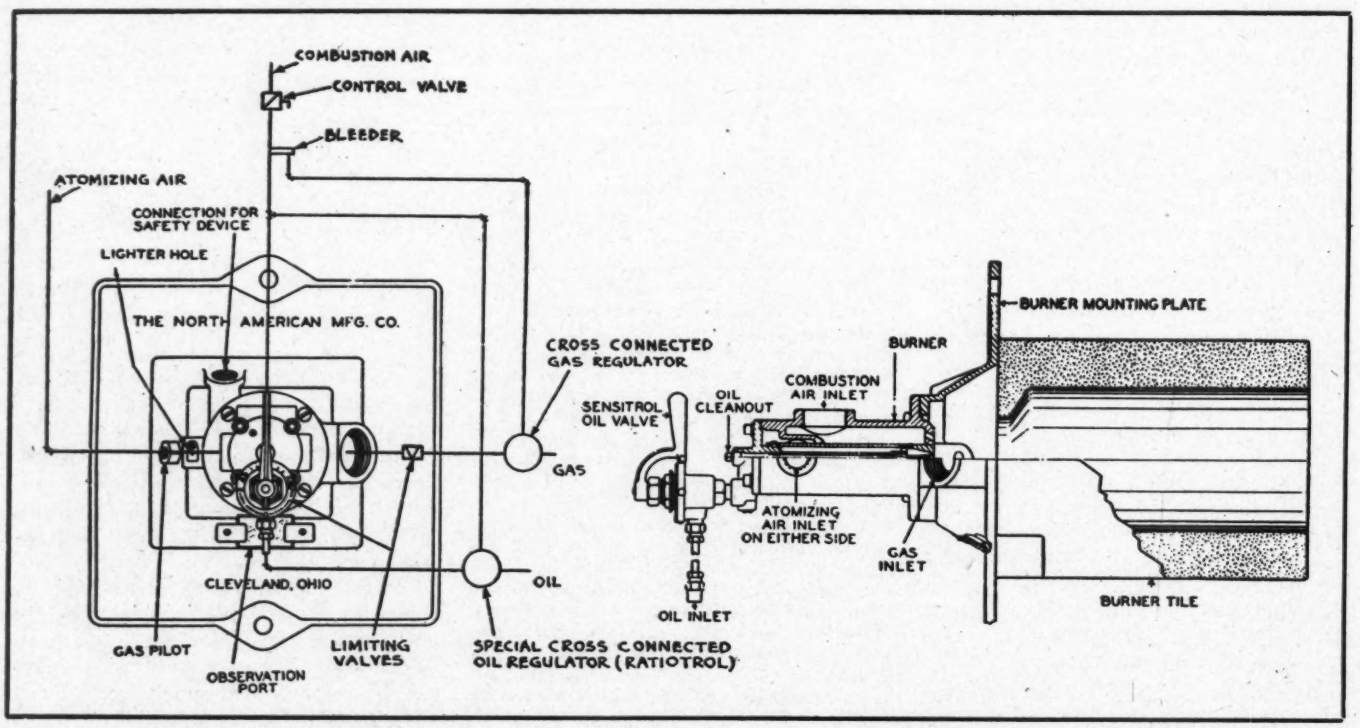


Fig. 1. Burner built to handle relatively small quantities of oil and gas and made in sizes from 1¼ to 3 in. inclusively.

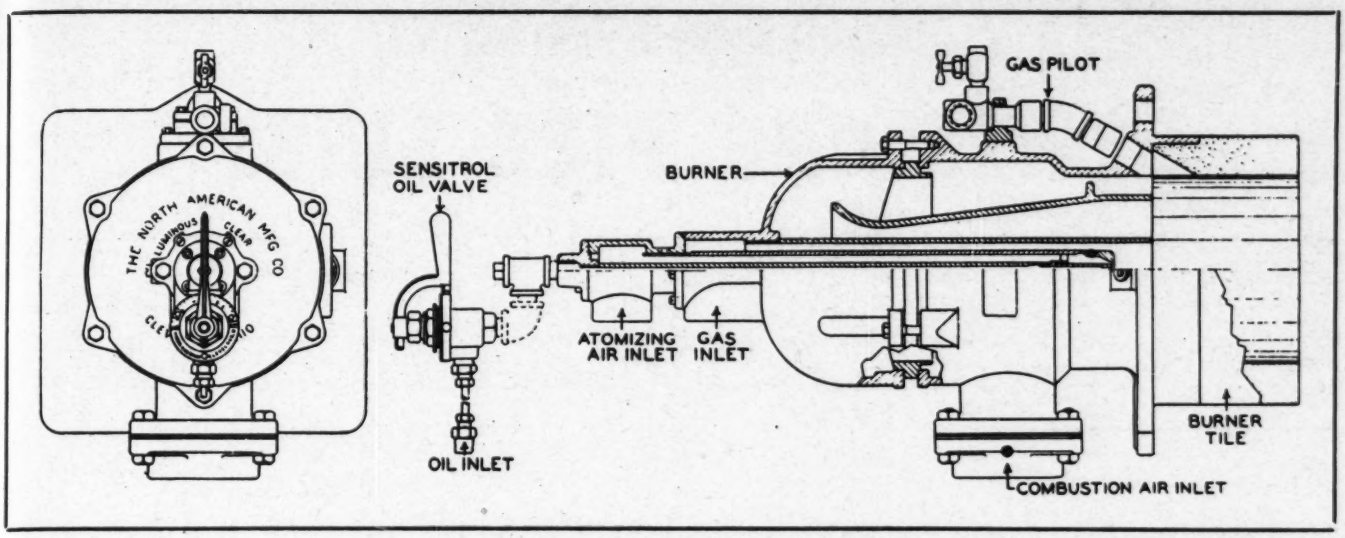


Fig. 2. Luminous flame type gas burner with low pressure air-oil atomizer installed in the gas tube and designed to be left there when operating on either fuel.

tirely at the discretion of the gas company. Some gas companies have contracts with pipe line companies to distribute larger quantities of gas than can be sold on a year around basis so that such interruptible service agreements to industrial users are used to balance the year around load.

Although gas is often sold rather cheaply under such agreements, it is possible to utilize it in this manner rather than to waste it as has often been done in the past. There are other circumstances under which the installation of gas-oil burners is of decided advantage, such as when manufactured gas shortages are produced due to the strike of coal miners and when mechanical breakdown of gas producers interferes with the continuous flow of gas to industrial furnaces.

Gas-oil burners are also installed at times with the idea in mind of getting a superior product and some forge and heat treating furnaces are operated using varying percentages of both fuels at the same time. Lower water vapor in the flue products and higher luminosity from the combustion of fuel oil together with better control achieved with gas supposedly give better surface and heating conditions under some circumstances. It is not known, however, whether the above advantages have ever been established as a scientific fact.

Burner Selection

Once it has been decided that the installation of gas-oil burners would be desirable and possible, a careful selection of the type of combination burner must be made. The type of fuel oil should be agreed upon and the oil pumping system and the combustion controls selected accordingly. Unless fuel consumptions are high and few burners are used, distillate oils only should be considered especially when combustion space limitations exist, fairly high fuel turndowns are demanded and controls are to function well. If the gas burners used are of the premixing type and conditions are to be duplicated as nearly as possible, the gas-oil burner should give the best possible mixing between atomized oil and combustion air.

Since all oil burners are essentially non-premixing burners, longer flames should be expected under all conditions. However, if the mixing is good and all combustion air is furnished by the blower, the following flame length figures might be used as a guide:

Gallons Per Hour	*Length of Flame in Feet*
1½	2
5	3
8	4
12½	5

If long flames are called for, it is easier to duplicate conditions with oil, and often the addition of an oil atomizer into an existing gas burner suffices. Since gas is, as already mentioned, the fuel that is easier to burn and to control, it is essential that a gas-oil burner be predominantly a good oil burner in order to produce comparable results.

Figs. 1 and 2 show the difference between the two types of gas-oil burners as produced by The North American Manufacturing Co. and also a schematic arrangement of the piping necessary for distillate and residue oils. The mode of control is also indicated.

Fig. 1 shows a burner built to handle relatively small quantities of oil and gas and made in sizes from 1¼ in. to 3 in. inclusively. The main combustion air is forced to pass through a series of double-angled holes as shown, and every individual air stream is made to cut through the atomized oil and air mixture to produce the fastest possible rate of combustion. Gas is introduced through the mounting plate and enters under suction produced by the action of the main air through the annular ring between the burner body and the burner tile. Its combustion is completed within the burner tile, while the combustion of the oil extends beyond it. Combustion of both gas and oil in a burner of this type is stable within the burner tile so that such a burner can be made to fit into a great many installations where gas alone is being used at present.

Luminous Flame Type Burner

Fig. 2 shows a luminous flame type gas burner with a low pressure air-oil atomizer installed in the gas tube and designed to be left there when operating on either fuel. Since the air velocities through such a burner are low, the direction of the air cannot be changed to produce rapid mixing with the atomized oil; this results in somewhat longer flames than those obtained with gas.

The lengths of such fires cannot be readily expressed, because just as with gas, they are affected by furnace length, etc. It is, however, possible to state that burners of this type will tend to give flames as long as the furnace itself, with the greatest heat liberation probably occurring somewhere between the middle of the furnace and the burner wall.

Compressed Air for
SWABBING PIPE LINES

EXCERPTS FROM an article by FRANK H. LOVE, first published in the "Petroleum Engineer," which details an effective means for swabbing pipe lines laid by the "stovepipe" method to remove foreign matter and determine existence of obstructions.

THE Stanolind Pipe Line Co., through a desire to have all pipe lines swabbed and free of obstructions piror to placing in service, has developed a method of swabbing with compressed air.

The swab and other necessary equipment were designed by members of the Tulsa staff of the company. Details of the construction of the swab and trap, and the method of operation are shown in Figs. 1 and 2.

The equipment was first used during construction of the Utah Oil Refining Company's 8-in. line from Ft. Laramie, Wyoming, to Salt Lake City, Utah. Air swabbing proved so efficient on that job that it has since been used on all lines laid by Stanolind and those supervised by Stanolind personnel.

In performing the swabbing operation, the pipe line is laid from the starting point in a continuous section for a distance of approximately five miles, where it is left apart for running the air swab. Although usually about five miles, the length of the section to be swabbed ordinarily is left to the judgment of the contractor subject to approval of a company inspector. These sections, however, must not exceed five miles; otherwise the rubber cups on the swabs will become worn and lose their cleaning efficiency and the sealing effect required to propel the swab.

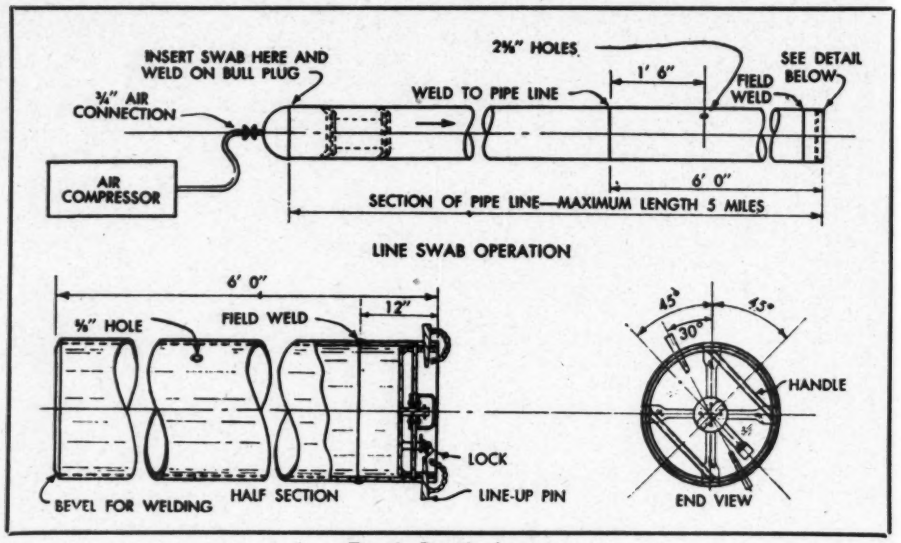


Fig. 1. Detail of trap.

TABLE OF DIMENSIONS

Size, in.	Wall thickness, in.	A, in.	B, in.	C, in.	D, in.	E, in.
12	0.375	11½	8	6½	12½	4½
12	0.500	11¼	8	6½	12½	4½
16	0.250	14 1/16	13⅜	11	18	8⅝
16	0.284	14¼	13⅜	11	18	8⅝
16	0.500	14⅛	13⅜	11	18	8⅝

After the swab is inserted into the line, a bull plug containing a ¾-in. air connection is welded to the end of the pipe. Then by means of compressed air supplied by a portable compressor the swab is propelled through the line to the receiving trap where it is removed. The swabbing operation continues in this manner as the line construction progresses.

Immediately after a section of line is swabbed it is tied into the newly completed portion of the line by welding. The end of the completed portion is kept closed at all times, except when a crew is making a tie-in weld to connect other swabbed sections of pipe.

Major river and creek crossings, constructed of extra heavy river pipe having a smaller inside diameter than line pipe, must be swabbed in a separate section and with a smaller diameter swab before being tied-in with the line on either side of the river.

A large air compressor, one having a minimum displacement of 240 cu. ft. of free air per min., is most suitable for air swabbing, especially when

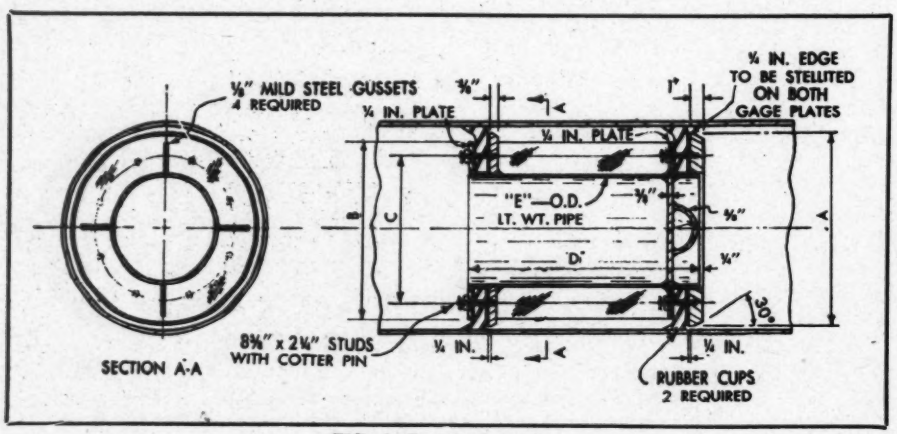


FIG. 2. Detail of swab.

the pipe being swabbed is of large diameter.

The use of compressed air in swabbing pipe lines is hazardous unless the danger is recognized and safe means provided that will prevent the swab being discharged from the line at high velocity. Stanolind experienced some trouble of this kind when air swabbing was first put into use, due to carelessness on the part of workmen. Consequently, several improvements have been made to the original trap, which is welded onto the exit end of the pipe for receiving the swab. The trap now used is shown in Fig. 2.

By use of air swabbing the entire line is cleaned and tested for obstructions before it is placed in service; otherwise there is a possibility of some obstruction existing that would block the passage of scrapers and make it necessary to evacuate the line to correct the trouble after it is filled with oil. In most instances this is a rather expensive matter; consequently, officials of the Stanolind Pipe Line Company feel that development of air swabbing has been well worth the expense and effort required.

Cast Iron Pipe with Mechanical Joints

Used for Installing a Municipal Gas System

OFFICIALS of small towns which may need a municipal gas system will be interested in the experience of four towns in southern Louisiana, each of which installed a municipal gas system several years ago.

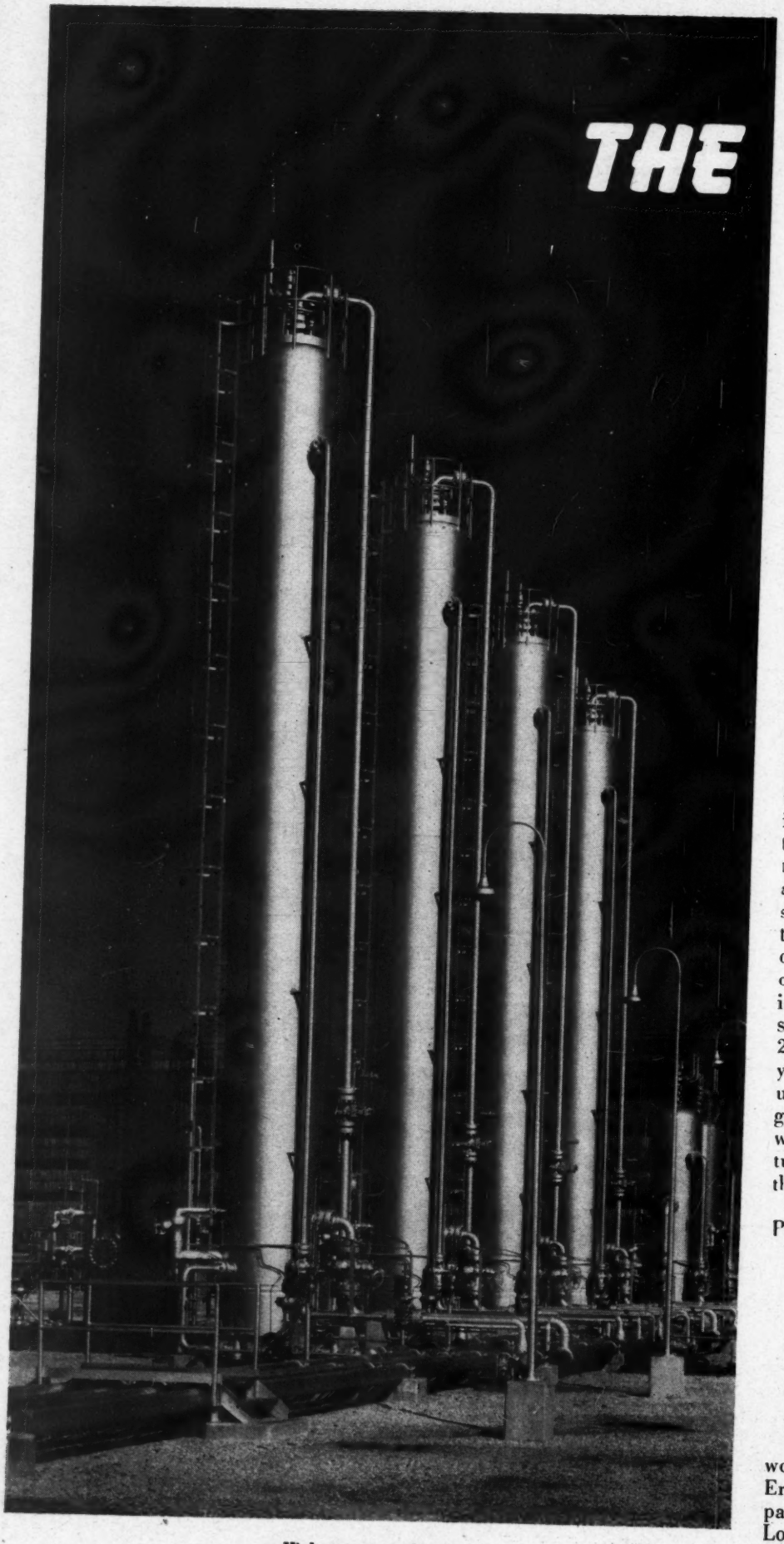
Cast iron pipe ranging in size from 1¼-in. to 6-in. is installed in the gas distribution systems in Houma, Eunice, Thibodaux and Delcambre.

Eunice and Delcambre both installed municipal gas systems in 1939. The gas distribution system in Houma was built in 1940 and at Thibodaux in 1942. Both of these municipalities have had steady growth and the gas distribution systems have been extended and meters added. Many of the bonds have been retired and the financial condition of the cities is excellent. The gas distribution systems are 100% cast iron pipe with mechanical joints.

The Houma system was designed by engineer T. Baker Smith of Houma; the Eunice system by J. M. Fourmy, Hammond, La.; the Thibodaux system by J. B. McCrary Co., Atlanta; and the Delcambre system by John Middleton of Hammond.

OPERATING AND FINANCIAL DATA LOUISIANA MUNICIPAL GAS SYSTEMS

	Houma	*Thibodaux*	*Eunice*	*Delcambre*
Year Began Operation	1940	1942	1939	1939
Quantity and Size Cast Iron Distribution Pipe Installed	1,732′ 6″x18′ 62,616′ 4″x18′ 168,000′ 2″x18′	12,288′ 6″x16′ 6,400′ 4″x16′ 32,028′ 3″x12′ 100,100′ 2″x18′	17,504′ 4″x16′ 21,396′ 3″x12′ 50,022′ 2″x18′	10,416′ 3″ x12′ 5,022′ 2¼″x18′ 1,296′ 2″ x18′ 5,634′ 1½″x18′
Kind and Size Service Lines	1¼″ C.I.	1¼″ C.I.	¾″ Substitute	¾″ Substitute
Number Consumers First Year	1800	771	1200	50
Number Consumers December, 1944	2525	971	1700	255
Rate Schedule December, 1944 For Domestic Service	First 5,000 cu. ft. @ $ .65 M	First 3,000 cu. ft. @ $ .75 M	First 1,000 cu. ft. @ $1.00 M	First 1,000 cu. ft. @ $1.00 M
	Second 5,000 cu. ft. @ $ .60 M	Next 7,000 cu. ft. @ $ .60 M	Next 4,000 cu. ft. @ $ .75 M	Next 3,000 cu. ft. @ $ .85 M
	Next 10,000 cu. ft. @ $ .55 M	All over cu. ft. @ $ .40 M	Next 5,000 cu. ft. @ $ .50 M	Next 6,000 cu. ft. @ $ .75 M
	All over cu. ft. @ $ .50 M	Min. $1.00 per Month	All over cu. ft. @ $ .25 M	All over cu. ft. @ $ .60 M
	Min. $1.00 Mo.		Min. $1.00 Mo.	Min. $1.00 Mo.
Average Monthly Domestic Bill	$3.00	$3.00	$3.50	$4.00
Distribution Pressure	7 to 15 Lbs.	5 to 10 Lbs.	7 to 15 Lbs.	8 Lbs.
Yearly Gas Send Out	184,186,000 cu.′	95,060,000 cu.′	194,000,000 cu.′	11,500,000 cu′
Price of Gas Purchased	$ .18 M cu. ft. at City Gate	$.205 M cu. ft. at City Gate	$ .07 M cu. ft. at Wells	$ .19 M cu. ft. at Transmission Line
Supply Pipe Line	9 Mi. 4″ Subst. Owned by Pipe Line Co.	½ Mi. 6″ Cast Iron Mech. Jt. Pipe Owned by Town	10 Mi. 4″ Subst. Owned by Town	2 Mi. 3″ Cast Iron Mechanical Joint Owned by Town
Tap Line Pressure	400 Lbs.	50 Lbs.	330 Lbs.	100 Lbs.
Original Amount Bond Issue	$225,000.00	$159,000.00	$65,000.00	$12,000.00 Plus $ 6,000 WPA help
Bonds Outstanding End 1944	$161,000.00	$148,000.00	$16,000.00	$7,500.00
Net Surplus in Gas Revenue Fund	$80,000.00	$27,500.00	$28,000.00	$5,600.00
Present Bond Interest Rate	2.77 to 3.25%	2.75 to 3.00%	2.25 to 3.50%	6%
Net Operating Revenue 1944	$41,000.00	$14,000.00	$48,000.00	$2,200.00



High pressure absorbers.

THE ERATH CYCLIN

THE practice of cycling in the exploitation of a high pressure gas-condensate field has found frequent application recently in the Gulf Coast area and to a lesser extent in California. The cycling operation consists of producing the fluid from the high pressure sand which in most cases is in the vapor phase, lowering the pressure in separators to obtain condensate by means of retrograde condensation, stripping the gas in an absorption plant, recompressing the dry gas and returning it to the producing sand. Strategic location of wells allows production from one location and injection into another so that the liquefiable components will all be removed from the sand before the dry gas finds its way to the producing wells. Returning the gas to the producing sand maintains the sand pressure. This avoids retrograde condensation in the sand, which would cause wetting of the sand faces and loss of liquefiable components that could never be recovered. When the cycling operation is complete, which may require from several years in some plants to 15 and 20 in others, the project will have yielded a large volume of liquid products ranging from propane through gasoline and light gas oil and the field will still contain a high pressure natural gas reserve to be exploited in the normal fashion.

The description of the Erath Cycling Project may be subdivided as follows:

1. Field producing and injection system
2. Compressor unit
3. Absorption-distillation unit
4. Distillate unit
5. Fractionation unit
6. Metering and storage system
7. Utilities

The Erath project is one of the world's largest cycling projects. The Erath field is located in the eastern part of Vermilion Parish in Southern Louisiana about 10 miles inland from the Gulf of Mexico. This field is un-

By A. W. PRATT
Process Engineer, Stone & Webster Engineering Corporation

PROJECT

usually well adapted for cycling because of its circular form, the large number of producing horizons and the absence, with one minor exception, of faults within the main limits of the field. The unitized portion of the field is approximately three miles long and two miles wide. This allows the plant to be centrally located with relatively short connections to wells and assures the probability of high ultimate recovery of liquefiable products.

When sufficient producing wells had been drilled to indicate that the producing horizons from 8000 ft. to 11,600 ft. carried gas and condensate in commercial quantities, the operators in the field decided to unitize to conserve the natural resource and permit efficient development of the field.

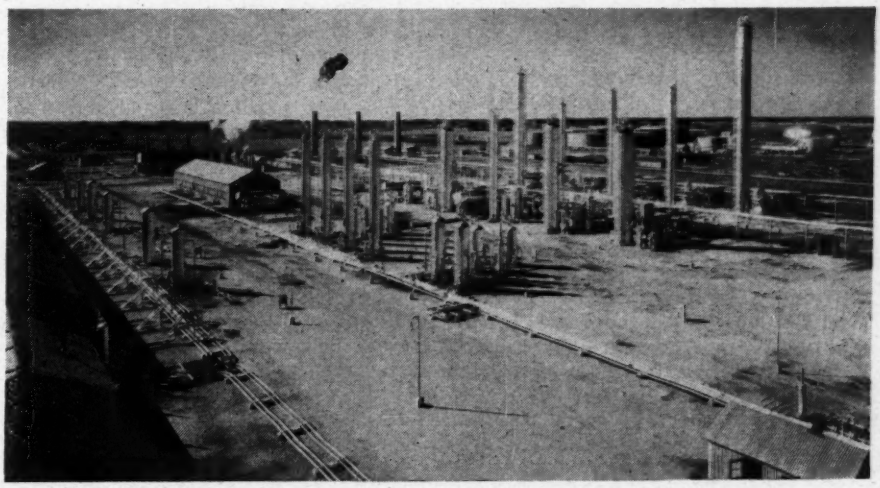
The unitization plan was approved by the State of Louisiana. The Texas Company, as owner of the largest interest in the field, was appointed operator to construct and operate a plant to recover condensate and other products and to cycle gas in the condensate reservoirs. The other principal owners are represented on various committees to which The Texas Company is responsible.

There were 29 wells in the Erath field at the time of plant completion consisting of 14 dual completion wells and 15 single completion wells. This makes a total of 43 separate connections to the underground reservoir of which 31 are producing and 12 are injection wells. Seventeen of the producing wells take gas from the high pressure sand at approximate depths of 10,000 to 11,600 ft. The remaining 14 produce gas and condensate from the lower pressure 8700 ft. sand. The high pressure gas gathering system is designed for a pressure of 4000 psi, while the low pressure gathering system is designed for a pressure of 2800 psi. These systems normally operate at 2400 and 1000 psi, respectively, and a total volume of 220 million SCF per day. Each producing well is equipped with a meter setting for metering the gas produced from each sand. Adjustable chokes control the flow. The producing wells are generally located toward the center of the field; the injection wells toward the periphery.

The dry gas injection system radiates from the plant to the 12 injection wells. The injection system is designed for a pressure of 5000 psi and returns approximately 192,000,000 SCF of gas per day to the formation normally. Each injection well is equipped with a meter setting, a separator pot to scrub out any lubricating oil carried into the system from the compressors and a globe valve to control the gas flow. All of the field lines are laid with at least 24 in. of cover so that the land traversed remains suitable for agricultural purposes. The lines are anchored and provided with expansion offsets. The injection system carries the highest operating pressure in the project and therefore presented the most difficult piping fabrication problems. Several miles of 6⅝ in. OD by 0.864 wall thickness high tensile carbon steel pipe were laid.

The compressor unit supplies the energy to the cycling operation. The gas from the producing wells, after pressure reduction, condensate separation and scrubbing in the absorption unit, flows to the compressor suction header. The suction pressure is selected after balancing several factors. The lower pressure carried in the plant inlet scrubbers and absorbers results in a greater separation of condensate and a smaller load on the absorption plant. However, the lower suction pressure on the compressors increases the total horsepower required, because the discharge pressure is fixed. The compressor suction pressure at Erath is 1850 psi. The compressors are designed to discharge at 5000 psi, although present operation requires several hundred pounds less. Sixteen 800-hp angle type gas engine driven compressors comprise the gas compressor unit. They are arranged in a 400 ft. line on 26 ft. centers.

Each compressor has eight power cylinders and four compressor cylinders. Each machine has at least three cylinders operating on injection duty. The fourth cylinder on certain machines is connected to compression duties related to the process units. In no case are less than two cylinders

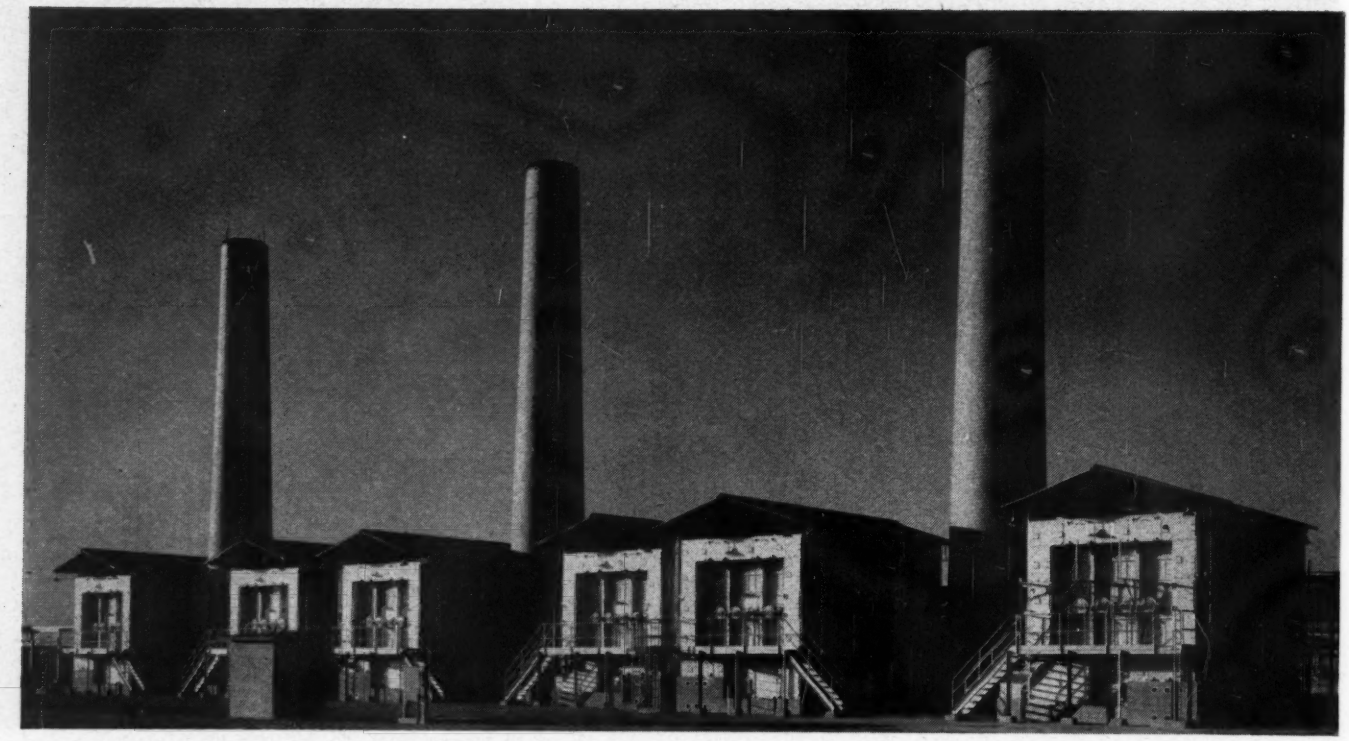


General view of plant looking southwest from cooling tower.

THE ERATH PLANT in Southern Louisiana is one of the largest cycling plants in the world particularly in regard to liquid products. The design pressure of 2000 psi for the absorbers and 5000 psi for the injection gas compressor discharge is unusual. Provision for the production of high purity light liquefied products is in accordance with recent trends in their utilization. Utilities are carefully balanced to give maximum thermal efficiency and complete independence from outside power sources. The Erath project demonstrates the ideal development of a natural resource wherein unitization insures a coordinated plan of exploitation with no waste. After the liquid products have been removed, there will remain a large volume of high pressure gas available for future utilization. The plant was processed, designed and constructed by Stone & Webster Engineering Corp. under direction of the Erath plant engineering committee. Appreciation is expressed to W. D. YALE of The Texas Company for his comments.

A. W. Pratt

The author is a graduate of Stevens Institute of Technology. Following service with Public Service Electric and Gas Co. of New Jersey, he became a process and design engineer engaged in the construction of natural gasoline, gas purification, and oil refining plants. For the past six years he has been with Stone & Webster.



Oil heating furnaces.

connected to a single duty, so that in event of failure of one compressor, all operations will continue at partial capacity. Gas engine driven water circulating pumps in the north end of the compressor house supply cooling water for the compressors. Three pumps supply jacket cooling water, and two pumps supply water for the lubricating oil coolers. The jacket water system is a closed system which has been charged with treated water from the boiler plant. The pumps take suction from a surge tank and circulate the warm jacket water through the cooling sections in the cooling tower and then through the compressor jackets. Warm water from the jackets flows back to the surge tank which operates at atmospheric pressure. The temperature of the water to the jackets is 140° and from the jackets is 150°. Two gas engine driven air compressors maintain air pressure in the air tanks for starting the compressors and for general plant use. Lubricating oil for the gas engines is stored in large tanks outside the compressor building and piped to various points in the compressor and lean oil pump houses.

The compressor building is 483 ft. long, 30 ft. wide and 17 ft. high. It is steel frame construction with corrugated asbestos walls and roof. The compressors are set on concrete blocks tied into a continuous reinforced concrete mat. The floor level is 2 ft. above ground level. Trenches on the compressor cylinder side accommodate the gas suction and discharge piping. This piping comes out through the compressor house wall above ground so that the lines can be carried on piers with clearance for painting and maintenance. Trenches on the opposite side of the building running its entire length accommodate the fuel gas, starting air and water lines. Compressor oil coolers are also located in this trench on steps in the compressor foundations. All trenches are covered with steel floor plates which are easily removable. Locating all piping and oil coolers under the floor leaves the operating aisles and overhead space remarkably free of obstruction.

Absorption-Distillation Unit

The absorption-distillation unit recovers the desirable constituents from the gas after distillate separation and produces a raw liquid stream requiring fractionation.

The gas from the gathering system flows through atmospheric sections in the cooling tower where it is cooled from 130° F to 100° F. The gas then passes through the reducing regulators set to maintain 1850 psi on the compressor suction and then into the inlet separators. Retrograde condensate formed by the combination of pressure reduction and cooling is separated from the gas in these vessels, and the gas then flows upward through the four absorbers operating in parallel where additional desirable material is absorbed by countercurrent contact with lean oil on the bubble trays. Gas from the top of the absorbers flows through scrubbers to remove oil entrainment and then to the compressor suction. The separators, absorbers and scrubbers designed for 2000 psi are of laminated steel plate construction approximately 4 in. in total thickness.

Rich oil from the base of the absorbers flows through the first and second flash drums operating at 1000 and 400 psi, respectively. A considerable volume of light gas, essentially methane, is released by this pressure reduction, and is returned to the compressor plant for recompression. The rich oil then flows to the third rich oil flash drum operating at 65 psi where gas is released to the low pressure absorber. Rich oil from the base of the reabsorber combines with the main rich oil stream in the third rich oil flash drum, and is pumped through the heat exchangers into the hot rich oil flash drum. Hot flashed vapors flow directly to the high pressure still. The hot rich oil flows through the rich oil furnace where it is heated to approximately 500° F and then enters the high pressure still. Absorbed hydrocarbons through 400° F boiling point are steam stripped from the rich oil at 60 psi. The still overhead product is partially condensed, the liquid entering the depentanizer feed tank, and the vapors entering the compressor plant for re-

compression. The semi-rich oil flows to the low pressure still where residual heavy absorbed material is steam stripped from it at 15 psi. The hot lean oil is then pumped through the lean to rich oil exchangers through the oil coolers and subcoolers to the lean oil surge tank. Cold lean oil from the surge tank is pumped to the absorbers at 1850 psi discharge pressure. The four lean oil pumps are triplex plunger type reciprocating pumps each having a capacity of 305 gpm and each driven by a 400-hp vertical gas engine. The absorption oil system is a closed regenerative cycle. A reclaimer still in this cycle, located adjacent to the low pressure still, constantly treats a small quantity of lean oil to remove impurities and maintain its quality. The oil characteristics are approximately 42° API, 240 molecular weight, 470° F IBP and 625° F EP. Oil losses are made up by feeding heavy distillate to the reclaiming unit which removes the heavy ends before entering the main oil system.

Distillate Unit

The distillate unit separates the raw distillate from the inlet separator into a light distillate requiring fractionation and a finished heavy distillate product.

The distillate after separation from the gas in the inlet scrubbers flows through the first and second distillate flash drums operating at 1000 and 400 psi, respectively. Similar to the rich oil flashing steps, a considerable volume of light gas, essentially methane, is released by the successive pressure reductions, and returned to the compressor plant for recompression. The distillate then flows to the third distillate flash drum which is a large horizontal tank serving both as a disengaging drum for additional light gas, and as a surge tank for the distillate fractionator feed pump. The flashed gas flows to the low pressure absorber. The distillate is pumped from the surge tank through exchangers to the hot distillate flash drum. Hot vapors are flashed direct to the distillate still and the hot distillate flows to the distillate furnaces. The distillate is heated to approximately 500° F and flows to the distillate fractionator where it is divided into an overhead product having a 400° F end point and a bottom product having a 400°F initial boiling point. The overhead product is partially condensed, the vapors flow to the low pressure recompressor and the liquid to the depentanizer feed tank. The heavy distillate bottoms product is cooled, combined with certain other streams and flows to storage.

Fractionation Unit

The fractionation unit separates the 400 EP and lighter liquefied material into a methane-ethane fuel gas stream, a propane product, a butane product, and isopentane product and a normal pentane to 400° F end point product. It consists of the following: 1. Depentanizer, 2. De-ethanizer, 3. Depropanizer, 4. Debutanizer, 5. De-isopentanizer.

The subunits of the fractionating unit are generally similar. Each contains a bubble tray column ranging from 80 ft. to 120 ft. high, 5 ft. to 8 ft. in diameter and containing 30 to 60 bubble trays. A reflux condenser, accumulator and pump serve each tower. Steam heated reboilers, with the exception of the depentanizer, supply heat to each tower.

The depentanizer produces an overhead product containing pentane and lighter, and a bottom product containing hexane through 400° F end point material. The bottom product flows through heat exchangers to storage. A stream from the bottom of the depentanizer is circulated through the depentanizer furnace, and returned to the base of the tower to supply heat to the fractionation process. The overhead product is pumped to the de-ethanizer.

The de-ethanizer removes methane and ethane as an overhead gaseous product. A limited quantity of propane is required in the overhead product to obtain reflux at the operating temperature and pressure at the outlet of the reflux condenser. The controls are so arranged that this propane loss is maintained at a minimum. The overhead gas passes to the recompressors. The bottom product flows to the depropanizer feed tank.

The depropanizer feed tank is a large horizontal tank providing surge capacity sufficient to insure a feed of constant quantity and quality to the remaining units which perform the more difficult fractionating operations. The depropanizer produces a liquid propane overhead product.

The depropanizer bottoms flow to the debutanizer. A mixture of iso and normal butane is produced as a liquid overhead product. In the future, it will be possible to install an additional fractionator to separate the iso from the normal butane if local requirements develop.

The debutanizer bottoms flow to the de-isopentanizer where isopentane is produced as a liquid overhead product. The bottoms containing normal pentane and some heavier material combine with the depentanizer bottoms product and flow to the No. 2 product storage tank.

Product Metering and Disposition

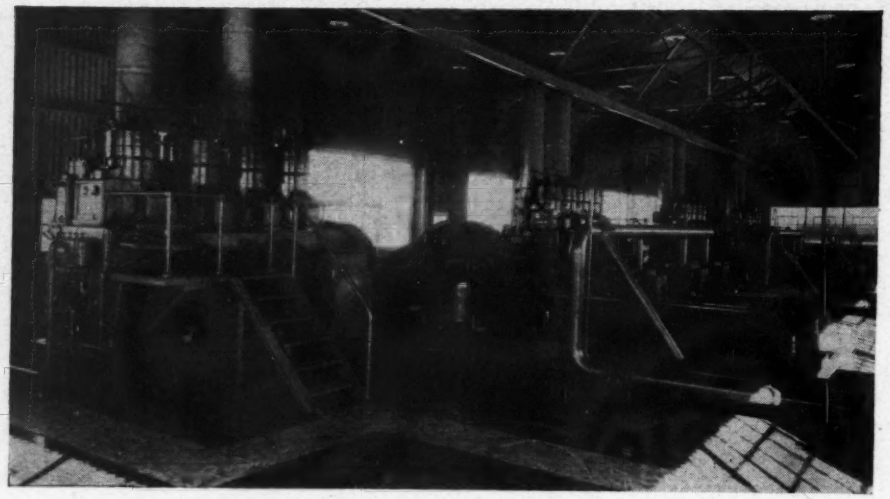
The products are metered by positive displacement meters and flow to the storage tanks. Products from the plant are as follows:

Name	Source
Butanes	Debutanizer overhead
Isopentane	De-isopentanizer overhead
400° IBP and heavier	Distillate still bottoms

These three streams combine as one

Summary of Data

Well fluids to plant	220,000,000	SCF/24 hr.
Gas returned to formation	197,000,000	SCF/24 hr.
Liquid products	16,000	Bbl/24 hr
Lean oil circulation total	914	Gpm
Gas compressors, 16 @ 800 BHP	12,800	BHP
Discharge pressure (design)	5,000	Psi
Tubular units, heat transfer surface	141,000	Sq. Ft.
All pressure vessels	1,240	Ton
All pipe (exclusive of valves and fittings)	6,100	Ton
Cooling tower circulation, water in 112° F, out 90° F	20,000	Gpm
Boilers: Rating, 3 @ 480 boiler hp	1,400	Hp
Steam quantity @ 235 psi	95,000	lb/hr
Fuel gas	11,000,0000	SCF/24 hr.



Interior view of lean oil pump house.

product, and flow to the pipe line storage tanks for pipe line shipment to the refinery. It is known as No. 1 product.

Name
Normal Pentane through 400° EP
Source
Depentanizer bottoms and de-isopentanizer bottoms

This product flows to separate storage tanks for pumping to barge loading and shipment to the refinery. It is known as No. 2 product.

Name
Propane
Source
Depropanizer overhead

The total of liquid products from the plant is approximately 16,000 bbl per day during normal operation.

Utilities

Dry gas from the process is used as a fuel source distributed throughout the plant at 40 psi. The large prime movers which use the largest quantity of fuel are gas engine driven. These items with total horsepower are as follows:

	BHP
Gas Compressors	12,800
Lean Oil Pumps	1,600
Water Pumps	1,350
Electric Generators	200
Total	15,950

The remaining prime movers are centrifugal and reciprocating pumps totaling approximately 1000 BHP which are steam driven. The turbine driven units exhaust at 100 psi and 30 psi, respectively, to supply steam for the process used both for stripping and for low level heating. Steam is supplied to the pumps at 235 psi from three 480 hp water tube boilers generating approximately 95,000 lb. per hour of steam.

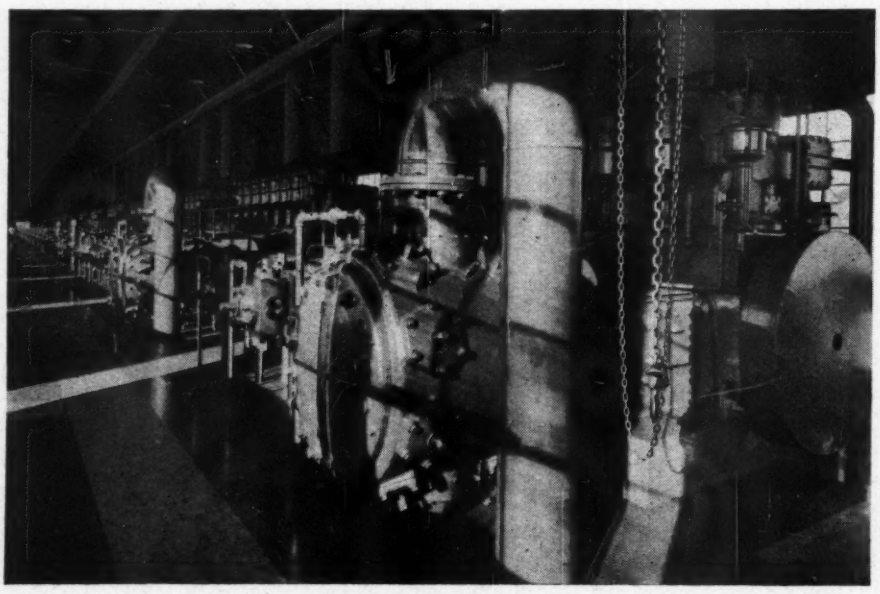
High level heat is supplied to the process by direct fired furnaces. These furnaces are of box type construction with the fluid to be heated passing through the tubes. There are six furnaces with two furnaces per service. Services and total duties per service are as follows:

Rich Oil Furnaces	44,500,000 Btu/hr
Distillate Furnaces	30,700,000 Btu/hr
Depentanizer Reboiler Furnaces	24,000,000 Btu/hr
Total	99,200,000 Btu/hr

A high overall thermal efficiency is obtained for the plant by this combination of fuel utilization. The gas engines require approximately 10,000 Btu of fuel per BHP. The remaining pumps get their power for a small expenditure of heat because the steam used to drive them is required elsewhere in the process at lower pressure levels. The direct fired furnaces supply their heat to the process without the losses attendant with the transmission of heat to a circulating medium and the subsequent transmission from the circulating medium to the process.

Of the heat in the fuel supplied to the gas engines, about half must be removed in the cooling water circulated through jackets and gas coolers. All of the heat supplied to the process must be removed by subsequent cooling since the operations requiring heat are essentially successive steps of evaporation and condensation. Therefore, from the roughly 400,000,000 Btu per hour supplied to the plant in fuel, 270,000,000 Btu per hour must be removed by the cooling system. The cooling system's main element is an atmospheric type cooling tower 660 ft. long, 24 ft. wide and 58 ft. high. An 11 ft. high coil shed accommodates the cooling and condensing tubular atmospheric sections. These take care of 85% of the cooling requirements of the plant. Well water at 71° is used in shell and tube coolers and condensers at strategic points in the process where low temperatures are required.

Electrical requirements of the plant are low. With the exception of a few small electric motors in the boiler feed water treating system, the main electrical demand is for lighting both in the plant and in the cottage area. Two gas engine driven 75 kw 480 v, 3-phase electrical generators supply this current. Failure of the electrical system does not interfere with the continuity of the plant operation because all prime movers are either gas engine or steam driven.



Interior view of compressor house.

FPC NATURAL GAS INVESTIGATION

(Chicago Hearings)

THE Chicago hearings in the Federal Power Commission's Field Investigations of the Natural Gas Industry drew the largest number of witnesses heard in any city to date when over 100 men, most of them from various gas consuming interests, appeared before the Commission between February 19 and March 4 when the hearings closed. Approximately half of the witnesses were from manufacturers and large industrial users of natural gas. Many of these use the fuel in operations that fall within the classifications regarded by the Commission as inferior uses, and they generally expressed their concern lest at some future date, and as the result of some new powers to be assumed by the federal authority, they might find themselves deprived of the full and unrestricted use of gas. Other testimony came from representatives of elected and appointed state and municipal officials as well as officers of city groups, chambers of commerce, and trade associations. These too formed a solid phalanx in opposition to any further encroachment of federal jurisdiction over local authority in fuel matters.

Eight States Represented

Representatives from either government or industry, or both, from eight states were heard. Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota and Nebraska comprised the gas consuming states putting in testimony. Wisconsin was conspicuous as the one state with natural gas on all her borders, but from which it has been successfully excluded by the political activities of the natural gas obstructionists.

Warren Henry, of the Illinois Commerce Commission developed the theory, and necessity in practice, of interruptible gas contracts to maintain desirable load factor on transmission lines. George F. Mitchell and Ralph R. Braucher of the Chicago Industrial Pipeline Co. embellished the point that industrial consumers on both interruptible and firm contracts make it possible to distribute gas for domestic and commercial uses at rates lower than could otherwise be given.

J. W. Clark of the Minnesota Resources Commission urged the unfettered movement of all commodities including natural gas across state lines. He pointed out that Minnesota has no desire to keep its iron production within the borders of the state. Representatives of St. Paul, New Ulm, Mankato, Albert Lea, St. Olaf's College, Northfield, Owatonna, Rochester, and Le Sueur testified or presented resolutions picturing the continued and unhampered use of natural gas as essential to the convenience and necessity of Minnesota homes, commerce, and industry.

R. Q. Selby of the Iowa Development Association and Edward A. Kimball of the Iowa Manufacturers' Association testified to the effect that continued use of natural gas is essential to industries and agriculture throughout the state of Iowa. Both voiced the opinion that no pipe line could operate efficiently under restrictions that would arbitrarily curtail industrial use.

Lawrence Cannon, William F. Lebo, and Allen D. Fiske of the Public Service Commission of Indiana speaking for the people of the state said they do not want or seek their gas supply on the basis of inequitable limitations upon other areas. The Indiana Commission, however, favors some form of control that will insure against discrimination in favor of one area over another at times when supply and transportation facilities might prove inadequate. Such control the Commission believes should be only temporary in nature, pending the construction of new facilities to supply an expanding demand. This control, a witness for the Commission acknowledged, should be lodged with a federal agency. It was also urged by one witness that the FPC should assume responsibility for keeping gas transmission facilities abreast of growing needs. If necessary, the state body should favor an amendment to the Natural Gas Act to make clear such power and responsibility. The general desirability and necessity for natural gas as an industrial fuel was attested to by a large number of executives and engineers from Indiana's industrial concerns.

William J. McBrearty of the Michigan Public Service Commission outlined his state's position. He pointed to the dwindling natural gas reserves of the state, which at the present rate of withdrawal, are expected to last but five years. In summary, he contended that Michigan has a sound and economical gas conservation policy; that an adequate supply is vital to the economic life of the state, and that any restriction upon that supply through the erection of trade barriers would adversely affect the economy of both the state and the nation. He opposes FPC authority over end-use, but is in favor of state control over direct industrial sales. Industrial users were again called to testify to the indispensibility of natural gas in various manufacturing processes now being used in industries located within the state.

Michigan Presentation

The Michigan presentation was one of the most elaborate yet to be presented to the FPC in all of the investigation. In addition to the commissioner, Senator Homer Ferguson and Lt.-Governor Vernon Brown, appeared on the stand. They were followed by either the mayor or city manager of every large industrial city in the state. All made strong pleas for unrestricted suppies of natural gas as essential to the economy of the various municipalities over which they preside.

Nebraska witnesses represented many industrial plants of the state. Characteristic information supplied included number of employees; the nature and value of products processed or manufactured through the aid of natural gas; and in many instances the cost, inconvenience or impossibility of converting from natural gas to an inferior fuel. All voiced specific opposition to the curtailment in any way of the amount of gas that they might be permitted to use in their several manufacturing and processing operations.

William H. Bailey of the Colorado Fuel and Iron Works gave some statistics on the fuel consumed by his plant, and it was announced by John Poe, attorney for the Natural Gas Industrial Committee, that additional Colorado witnesses had been obliged to postpone presentation of their testimony until the Washington hearing which is expected to begin about the middle of May.

From Wisconsin where proponents of a progressive fuel policy have suf-

fered habitual and repeated defeat at the hands of organized labor fronting for the railroad and coal interests, John Klatt representing the State Council of Sheet Metal Workers, and the Sheet Metal Union of Milwaukee asserted that this Council was unanimously in favor of the introduction of natural gas into Wisconsin. The workers believe, he testified, that more jobs would be created for the members of the union, and that they would benefit also as individuals through the cleanliness and convenience that would follow the use of natural gas in their own homes.

H. J. O'Leary of the Wisconsin Public Service Commission placed in the record a comprehensive exhibit showing the estimated market for natural gas in Wisconsin. His studies indicate that annual residential, commercial, and industrial sales in Wisconsin are expected to reach 31,706,106 Mcf of gas annually by the end of the first five-year period.

John Crimmins representing the Koppers Co. expressed the opinion that natural gas might easily be withheld from a city in which a coke plant had been established because of the investment in this plant that might otherwise be imperiled. In an exchange, Mr. O'Leary contended that the same argument could be advanced to save the tallow candle industry from the invasion of electric lights.

William Petersen of the Wisconsin State Chamber of Commerce disclosed that a poll of the membership of the chamber indicated that 403 out of 467 members who answered an inquiry favored the introduction of natural gas. Many industrial plants, making such widely diversified products as malt, furnaces, radiators, fountain pens, steel tubing, and cheese, all expressed unanimous demand that natural gas be made available, and many excoriated the political maneuvers that have withheld gas from the state.

A brief session scheduled to start in Charleston, W. Va., April 2 concludes the circuit of in-the-field hearings by the FPC. Final hearings will open in Washington on June 17.

Hammel Radiator Engineering Co. Builds New Addition

The Hammel Radiator Engineering Co. recently broke ground for an addition to their factory at 3348 Motor Ave., Los Angeles. A. S. Martinson, president, officiated at the ground breaking ceremony which was attended by those associated with him in Hammel Radiator, Columbia Water Heater Corp. and Pacific Overhead Door Co.

In October 1942, A. S. Martinson and S. D. Crozier purchased the Hammel Radiator Corp. from C. H. Pill, who moved the business to its present location in 1936. Martinson and Crozier operated the business as the Hammel Radiator Engineering Co. and were active in war work, completing numerous contracts for war material, as well as continuing the manufacture of gas and oil heating equipment.

In July 1944, Martinson purchased Crozier's interest and sold a portion of the business to six associates, R. A. Martinson, F. O. Suffron, R. E. Washburn, L. K. Silvrants, Wm. Ensley and L. M. Hull. This group continued the completion of the war contracts and reestablished themselves as manufacturers of gas heating equipment.

The original company started in the present location in 1936 with one building of 7500 sq. ft. and expanded until in 1942 it occupied 21,000 sq. ft. The plant was destroyed by fire in June, 1942, and rebuilt in 1942 to 1944. The area covered by the present plant including the new addition will be 33,000 sq ft.

The addition will greatly improve the efficiency of the plant and increase the output. At the same time, the entire production line in the present plant is being revamped to accomplish this added capacity. New machinery, modern ovens and conveyor line are being installed.

Martinson is associated with Eric Slater and R. A. Martinson in the Columbia Water Heater Corp., 230 S. Dolan St., Downey, Calif., where a new modern plant is being built.

Martinson and W. W. Harper have recently purchased the Pacific Overhead Door Co., formerly of 3745 Durango Ave., Los Angeles, now located at 3376 Motor Ave. They will continue to manufacture overhead garage door hardware.

Those present at the ground breaking ceremony for the new Hammel Radiator Engineering Co. building were (left to right), Eric Slater; R. E. Washburn; William Ensley; L. K. Silvrants; L. M. Hull, vice president A. S. Martinson, president, with shovel; R. A. Martinson, secretary and treasurer; F. O. Suffron; W. W. Harper.

Southern California Gas Co. Building in Huntington Park

Ground was broken on Feb. 25 for a new $68,000 distribution headquarters for Huntington Park, to be erected by Southern California Gas Co. The building, designed by R. V. Derrah, will be similar to others in the company system, and the contract was given to Stanton-Reed Co. The tract is 436x253 ft. and approximately 50% of this area will be paved and fenced in. A one-story, reinforced concrete building will house the distribution department offices and facilities, and a garage, located about 50 ft. away, will be open on one side.

Calorific Value of Gases Determined by New Method

A subgroup of Committee D-3 on Gaseous Fuels of the American Society for Testing Materials, under the chairmanship of R. S. Jessup, National Bureau of Standards, has completed a tentative method of test for calorific value of gaseous fuels by the waterflow calorimeter. Suggestions from members of the Society on a proposed draft were reviewed at a meeting recently held in Pittsburgh. The new method is expected to be ready for presentation to the Society for formal adoption at its June meeting.

Kitchen Planning Is Theme Of McCall Contest Awards

Kitchen planning is the theme of the sixth annual award offered by McCall's magazine, through the A.G.A., to the department, department head, or individual deemed to have made the most outstanding contributions to the advancement of living by means of educating the American housewife toward better planned kitchens making use of gas equipment.

B.U. Appliance Deliveries Are Highest Ever Recorded

Brooklyn Union Gas Co. has announced that net delivered appliance sales for February were the highest ever experienced in that month. They amounted to $294,711, nearly $116,000 above the previous February record established in 1942. This brought the two-month total for 1946 to $550,000.

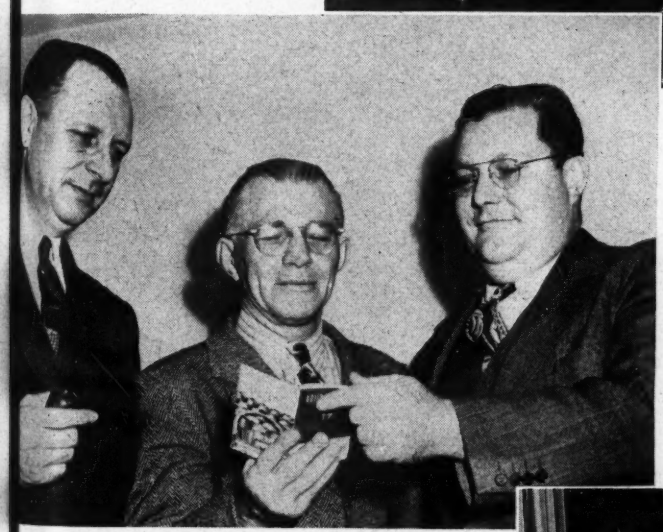
GAS MEN

in the Spotlight

A.G.A.'s Managing Director **H. Carl Wolf,** on his first trip to the Pacific Coast last month, made a two-day stopover in Los Angeles. Here he is shown at a press conference with **Leroy M. Edwards** (left), vice president and general manager of Pacific Lighting Corp., and **Norman R. McKee** (right), vice president of Southern Counties Gas Co.

New president of Roots-Connersville Blower Corp., Connersville, Ind., is **John Avery** (left) shown in conference with **J. S. Tatman,** retiring president who becomes board chairman.

Percival C. Keith, president of Hydrocarbon Research, Inc. (above, right), who has developed a process for making gasoline from natural gas receives the Medal for Merit, highest civilian award, for his contribution to the war effort as technical director of the atomic bomb gaseous diffusion plant at Oak Ridge, Tenn. Secretary of War **Robert P. Patterson** presented the award.



The Food Service Equipment Committee of A.G.A.'s Industrial and Commercial Section (below) has just launched a long range program in the interests of commercial cooking and baking with gas. From left to right: Chairman **Leon Ourusoff,** Washington Gas Light Co.; **Walter S. Anderson,** Chairman, subcommittee on Sales Training, Boston Consolidated Gas Co.; **C. C. Hawthorn,** chairman, sub-committee on Cooperation with Manufacturers, The Philadelphia Gas Works Co.; **Roy E. Wright,** representing Section Managing Committee, NEGA Service Corp., Cambridge, Mass.; **J. C. Rockefeller,** chairman, sub-committee on Sales Promotion, Public Service Electric & Gas Co., Newark, N. J.; **H. B. Wilson,** chairman, sub-committee on Appliance Upgrading, The Brooklyn Union Gas Co.

Lyle Harvey, president of Bryant Heater Co., a member of Dresser Industries, Inc., discusses the company's expanded operations with **Elroy Payne** (center), president of the Payne Furnace Co., Beverly Hills, also a Dresser affiliate, and **R. E. Reimer** (right), Byrant secretary-treasurer at the company's three-day meeting for distributors last month.

ASSOCIATIONS

NEGA'S 20th Meeting

LABOR relations, public relations and industrial relations took top billing in the two day business session of the New England Gas Association which marked the 20th year of the existance of that organization, held in Boston March 21 and 22.

A labor relations forum, on the afternoon of the second day, held most of the delegates and visitors interested in the seminar discussion until the last drop of the chairman's gavel.

In the forum, academic authorities and practical labor relations experts, under the chairmanship of Thomas G. Dignan, Melrose, Mass., answered questions that had previously been submitted, and then took on a free for all period of specific inquiries originating in the audience.

Promotion on Merit Discussed

How does a seniority clause in a union contract affect promotion on the basis of merit? James J. Healey, lecturer on Industrial Relations at Harvard University and a member of the New England Wage Stabilization Board, pointed out that seniority is a protection to the union man, but that it can go too far if it works against promotion on the basis of merit. Management, however, should have clearly defined criteria by which it gauges merit, and these should be clear and understandable to the union man.

On the same question, Douglas M. McGregor, associate professor of Industrial Relations at Massachusetts Institute of Technology, cautioned that to be effective and understandable, merit ratings should be made on a periodic basis, with the employee entitled to a statement of his rating and the reasons if he so requests.

What proceedure is best for settling disputes, outside of compulsory arbitration? Douglass V. Brown, Professor of Industrial Relations at M.I.T., and aso a former member of the WLB for New England said that there is no cure-all formula. The three methods of settling disputes are: negotiation, conciliation and arbitration, and they should be invoked, under ordinary circumstances in the order named. He said that the proposition of outlawing strikes in public utilities was not likely to be successful and he was also skeptical of the value of the legal "cooling off period."

Richard P. Doherty, head of the Economics Department, Boston University, seconded his colleagues' observations in respect to the outlawing of strikes. Such a measure, which would have to be accomplished by law, would establish the principle of compulsory collective bargaining, which neither labor nor management views with enthusiasm. He opined that in time arbitration will become a more mature and a less emotional procedure.

Should gas company wages be governed by industry wages for the specific jobs, or by local wages for comparable jobs in other plants? John T. Dunlop, associate professor in the Department of Economics at Harvard mentioned several factors that must be considered: The importance of maintaining an equitable wage balance within a company—higher pay for jobs requiring higher skills; wages that take into consideration the annual compensation likely to be earned, along with vacations and other rights; and the necessity for maintaining a balance in many positions that cut across industry lines, are all considerations to be dealt with.

How far should management go in discussing proposed changes in compensation (outside of union contracts) with its employees. Prof. McGregor said that management should go all the way in discussing any policy changes with the employees that are to be affected, when such discussions in advance are at all possible. The employee fears change, rumors and premonitions only spell disaster to his security in his estimation. Open discussion often dispells these doubts, and in addition makes for more enthusiastic acceptance of any new plans if they have been discussed and their merits explained in advance. The professor emphasized that the foremen in particular should hear about new plans from the management, and not through their underlings or after a union announcement.

Other subjects discussed during the four sessions included addresses by the officers of the Association and of the American Gas Association. Clark Belden, NEGA executive secretary, reviewed the 20 years of Association history. Lyle C. Harvey spoke for the appliance manufacturers and as president of the Gas Appliance Manufacturers Association on "Your Manufacturer Faces the Future"—with confidence it may be stated.

David S. Reynolds of Boston, NEGA retiring president presented his address by proxy, due to his own absence on account of illness. E. J. Boothby, president of the American Gas Association brought greetings from that organization and a talk "Life Begins—In 1946," the more abundant life for gas in President Boothby's opinion.

Of strong regional interest were two papers dealing with New England. Theodore T. McCrosky, executive director of the Greater Boston Development Committee, Inc., spoke on "Planning New England's Future," and W. E. Anderson, superintendent of the Industrial Division of Boston Consolidated Gas Co., told of "Industrial Gas at Work in New England."

"Management Problems in a New Era" was the topic of Edwin E. Schell, head of the Department of Business and Engineering Administration at M.I.T. Theodore T. Brown, Professor of Business Statistics at Harvard Graduate School of Business Administration, presented "Finding Facts About Your Customers," the theory and methods of polling customer opinion as a short cut to information. Home financing was the interest in "Stretching the Homeowner's Dollar," by Arthur S. Goldman of "Architectural Forum."

Home Service Breakfast

Home service came in for a big play, with a home service breakfast, presided over by Susan A. Mack of Boston and a paper on the subject by Lilliam P. Dunbar of Cambridge.

"Production Developments," in which the progress of research in gas manufacturing was disclosed, was the subject of a paper by Edwin L. Hall of the American Gas Association.

D. A. Hulcy, Dallas, Texas, gave the whole story to date on the Gas Industry Sales Promotion Program sponsored by the A.G.A. He is chairman of the promotional committee of the national association.

Upon recommendation of the nominating committee, the following officers were elected: president, L. E. Knowlton, Providence; first vice-president, J. A. Cook, Lynn; second vice president, E. G. Twohey, Worcester; treasurer, Otto Price, Boston; and executive secretary, Clark Belden, Boston.

Southern Gas Association Elects New Officers

Dean A. Strickland, general sales manager of the United Gas Corp., Houston, was elected president of the Southern Gas Association at the closing business session of the Association's 35th annual convention at Galveston, March 23. Strickland, an active member of the Association for a number of years, served as a member of the board of directors during 1945. He succeeds Frank S. Kelly, Jr., of the Arkansas-Louisana Gas Co., Shreveport, as president. The new president also was chairman of the Association's special committee on improvement of gas utilization equipment.

R. S. Suttle

Robert Suttle of Austin, former faculty member of the University of Texas and active in the management engineering utilities business for approximately 14 years, was named managing director of the Southern Gas Association. Suttle will open the new SGA offices in Dallas as soon as quarters can be obtained.

Other officers named at the meeting were: W. L. Woodward, president of Zenith Gas System, Alva, Okla., first vice preisdent; W. H. Ligon, president of the Nashville Gas and Heating Co., Nashville, Tenn., second vice president; and L. L. Dyer, comptroller, Lone Star Gas Co., Dallas, treasurer.

Principal speaker at the final meeting, which was attended by approximately 1000 persons, was H. Carl Wolf, managing director of the American Gas Association.

A.G.A. Committee Formed On Market Research

Recognizing the importance of further research in the marketing of gas service and appliances and in the economics of producing, transporting and distributing gas, the American Gas Association is organizing a special committee on Economic and Market Research Needs, under the chairmanship of E. H. Eacker, vice president of the Boston Consolidated Gas Co.

As announced by President Everett J. Boothby, the objective of this committee will be to review economic and market studies recently made or started by committees of the Association, particularly the Postwar Planning committee, and to determine the needs of the industry for further marketing and economics research.

Food Equipment Committee Plans Long Range Program

The Food Service Equipment Committee of the A.G.A. Industrial and Commercial Gas Section, under the chairmanship of Leo Ourusoff, Washington Gas Light Co., has launched a long-range program in the interests of commercial cooking and baking with gas.

Four objectives in this program have been set forth by Ourusoff as the goal for this year's activities:

1. Sponsor a unified sales promotional program.
2. Start a sales training program.
3. Cause appliance upgrading.
4. Develop the closet possible unity of action with manufacturers.

To implement the above objectives, a sub-committee has been set up for each. The successful attainment of these objectives will be of great benefit to the users of commercial gas cooking and baking equipment as well as the manufacturers and gas companies. The chairmen of the sub-committees are:

J. A. Rockefeller, Public Service Electric & Gas Co., Newark, N.J.—sub-committee on Sales Promotion.

Walter S. Anderson, Boston Consolidated Gas Co.—sub-committee on Sales Training.

Harry B. Wilson, The Brooklyn Union Gas Co.—sub-committee on Appliance Upgrading.

C. C. Hawthorn, The Philadelphia Gas Works Co.—sub-committee on Cooperation with Manufacturers.

A Food Service Equipment Manual is now being compiled, and when published will provide those in the commercial cooking and baking field with a ready reference on all phases of commercial cooking and baking.

New A.G.A. Ad Features "Garden" Kitchen Design

As a change from emphasis on overall kitchen planning to direct sales appeal on appliances, the next national New Freedom Gas Kitchen advertisement will feature a garden kitchen to coincide with springtime vegetable and flower planting. The sales copy includes such phrases as "every work-saving feature you've ever wanted, special ventilating system to keep it cool and clean, new gas range with automatic clock control, hot water galore, constant cold to keep foods fresh—economical, too, with no moving parts". A circulation of 21,400,000 has been arranged with a number of leading magazines for this new ad.

Midwest Personnel Meeting Held in Kansas City

Industrial relations problems concerning the return to the 40-hr. week was the chief subject discussed at the meeting of the A.G.A. Midwest Personnel Conference at the Phillips Hotel, Kansas City, on March 7.

Nearly a full attendance was achieved and the majority of those present reported on the current status of contract negotiations. The need for foreman and supervisory training was emphasized.

A.G.A. Rate Engineers Hold Two Day Conference

Leading rate engineers of the gas utility industry were in attendance at the two-day conference of the A.G.A. Rate Committee held at A.G.A. Headquarters March 14 and 15. L. R. Lefferson, Ebasco Services Inc., chairman of the committee, presided at meetings at which current rate problems were discussed.

Program Completed For Mid-West Gas Association

The program has been completed for the three-day meeting of the Mid-West Gas Association April 8-10 at the St. Paul Hotel, St. Paul, Minn. General sessions will occupy the morning of each day. At noon on Monday and Tuesday, the group will be divided into sales, operating and accounting sections. Each will have a separate luncheon followed by a meeting. There will be a banquet for the entire group on Tuesday evening.

CALENDAR

April

Mid-West Gas Association — St. Paul Hotel, St. Paul, Minn., April 8-10.

American Gas Association, Residential Gas Section—New York-New Jersey Sales Conference, Rye, N.Y., April 11-12.

Interstate Oil Compact Commission Spring Quarterly Meeting—Tulsa Hotel, Tulsa, Okla., April 11-13.

American Gas Association Distribution and Motor Vehicle Conference—Hotel Stevens, Chicago, April 15-17.

Metropolitan Gas Heating and Air Conditioning Council—420 Lexington Ave., New York 17, N.Y., April 17.

Southwestern Gas Measurement Short Course — Norman, Okla., April 23-25.

May

American Gas Association Natural Gas Department, Annual Spring Meeting—Hotel Gibson, Cincinnati, May 7-8.

National Association of Corrosion Engineers Annual Meeting—President Hotel, Kansas City, Mo., May 7-9.

Indiana Gas Association, Annual Convention—French Lick Springs Hotel, French Lick, Ind., May 9-10.

Pennsylvania Gas Association—Galen Hall, Wernersville, Pa., May 21-23.

Natural Gas and Petroleum Association of Canada—Windsor, Ontario, May 22-23.

June

American Gas Association Joint Production and Chemical Committee Conference — Hotel Pennsylvania, New York City, June 3-5.

National Fire Protection Association—Boston, June 3-6.

American Gas Association Midwest Personnel Conference—PhillipsHotel, Kansas City, June 6.

Gas Appliance Manufacturers Association Annual Meeting — Drake Hotel, Chicago, June 11-12.

Canadian Gas Association, 39th Annual Convention—Mannoir Richelieu Hotel, Murray Bay, Quebec, June 18-21.

October

American Gas Association Annual Convention and Exhibit—Atlantic City, N. J., Oct. 7-11.

Oklahoma Utilities Association Holds 28th Annual Convention

THE Southwest offers raw materials and markets for a vast expansion of small industries if the utilities cooperate with commercial and legislative organizations to induce them to locate in the region. D. A. Hulcy, Lone Star Gas Co., Dallas, Texas, expressed this conviction to the twenty-eighth annual convention of the Oklahoma Utilities Association which met at the Biltmore Hotel, Oklahoma City, March 11 and 12.

That section also has advantages of climate, abundance of water, cheap fuel, skilled American labor trained during the war and plenty of room for industrial expansion, the gas company executive asserted.

In a comprehensive summary of the hearings held thus far by the Federal Power Commission investigation of the natural gas industry, Don Emery, Phillips Petroleum Co., Bartlesville, Okla., declared that the industry, "should always welcome the investigatory efforts of the Federal Power Commission. They afford an opportunity for the industry to emphasize the high quality of its public service, to see itself as others see it and to indicate its willingness to rectify its policies and its procedures where necessary in the public interests."

Referring to decisions of the United States Supreme Court in cases brought up from Oklahoma and West Virginia that a state policy to restrict exportation of natural gas would be an unconstitutional interference with interstate commerce, the speaker warned that such efforts would be utter folly. "Utterly ignoring the fact that each state depends in substantial measure upon the natural resources of other states, groups who counsel commercial isolation invite so much retaliation that the isolationist state would destroy quickly its own economy by restricting exportation of its own resources."

Alarm over incursions of federal bureaus into the fields of public utilities and other enterprises was expressed by several of the speakers.

George A. Davis, president, Oklahoma Gas & Electric Co., Oklahoma City, warned his hearers that unless they successfully oppose pending legislation which if enacted, would mean ultimate appropriation of $202,000,000 to construct steam plants, build transmission lines and extend a vast replica of TVA to the entire Southwest, there will not be a single privately owned electric utility remaining in that entire region within 25 years. He declared that the utilities in this section of the country are sincere in their offer to purchase all the electricity produced by government dams in the Southwest and retail it over their distribution systems to their customers at fair rates.

A joint legislative committee, created by the 1945 session of the Oklahoma legislature, is working diligently to devise a more equitable system of taxation in Oklahoma, State Senator James C. Nance, Purcell, Okla., said.

Speaking from the standpoint of 24 years experience as a legislator in Oklahoma the senator defended the present tax system of the state but favored some reductions in gift and inheritance taxes and some other adjustments which would place Oklahoma on an equality with Texas in the matter of encouragement to business and new enterprises.

While admitting that the present application of veterans training under the GI bill of rights is only about 50% effective in Oklahoma, Milt Phillips, state director of veterans services in Oklahoma, urged utility executives to survey their organizations to see if they cannot train more veterans under the program. Failures in the system are due to desire of some veterans to secure the extra pay allowance without actually taking the educational work, and willingness of some employers to be relieved of some of the pay obligations without an effort to give the veterans effective training under the GI program, the speaker said.

New officers elected last December took charge of the meeting. These included A. F. Potter, president, S. I. McElhoes, first vice president; L. A. Farmer, second vice president; E. C. Joullian, treasurer.

Directors adopted a resolution of appreciation to Miss Kate A. Niblack, secretary of the association, for her 25 years of faithful service in the organization.

A.G.A. Laboratories Publish Appliance Requirements

The American Gas Association Testing Laboratories have published a number of new requirements for appliance approval which become effective Jan. 1, 1947. Major additions consist of special requirements for high altitude performance of ranges, water heaters, space heaters, and central heating equipment. Also published is the first edition of new listing requirements for low water cut-off devices. The new high altitude specifications are expected to benefit 1.2 million people living in the Rocky Mountain area.

Pennsylvania Gas Men Elect 1946 Officers

At the annual business meeting of the Pennsylvania Natural Gas Men's Association, held in Pittsburgh recently, the following officers were elected for 1946: president, B. D. Phillips, T. W. Phillips Gas & Oil Co., Butler, Pa.; vice president, E. M. Borger, The Peoples Natural Gas Co., Pittsburgh; secretary, B. H. Smyers, Jr., 435 Sixth Ave., Pittsburgh; treasurer and assistant secretary, P. L. Kesel, 1015 Frick Bldg., Pittsburgh; and executive secretary, Mark Shields, 2619 Grant Bldg., Pittsburgh.

Pilot Design Study Begun By A.G.A. Laboratories

Initiation of a domestic gas research investigation into pilot design, construction, and performance has been undertaken by the A.G.A. Testing Laboratories. A literature study and engineering survey of contemporary pilots has been completed by the research staff of the West Coast Laboratories. Pilot burner temperatures are being analyzed and the groundwork is being laid for experimental phases of the investigation. A similar study of methods to prevent closure of pilot air openings is under way at the Cleveland Laboratories.

Industrial and Commercial Hall of Fame Instituted

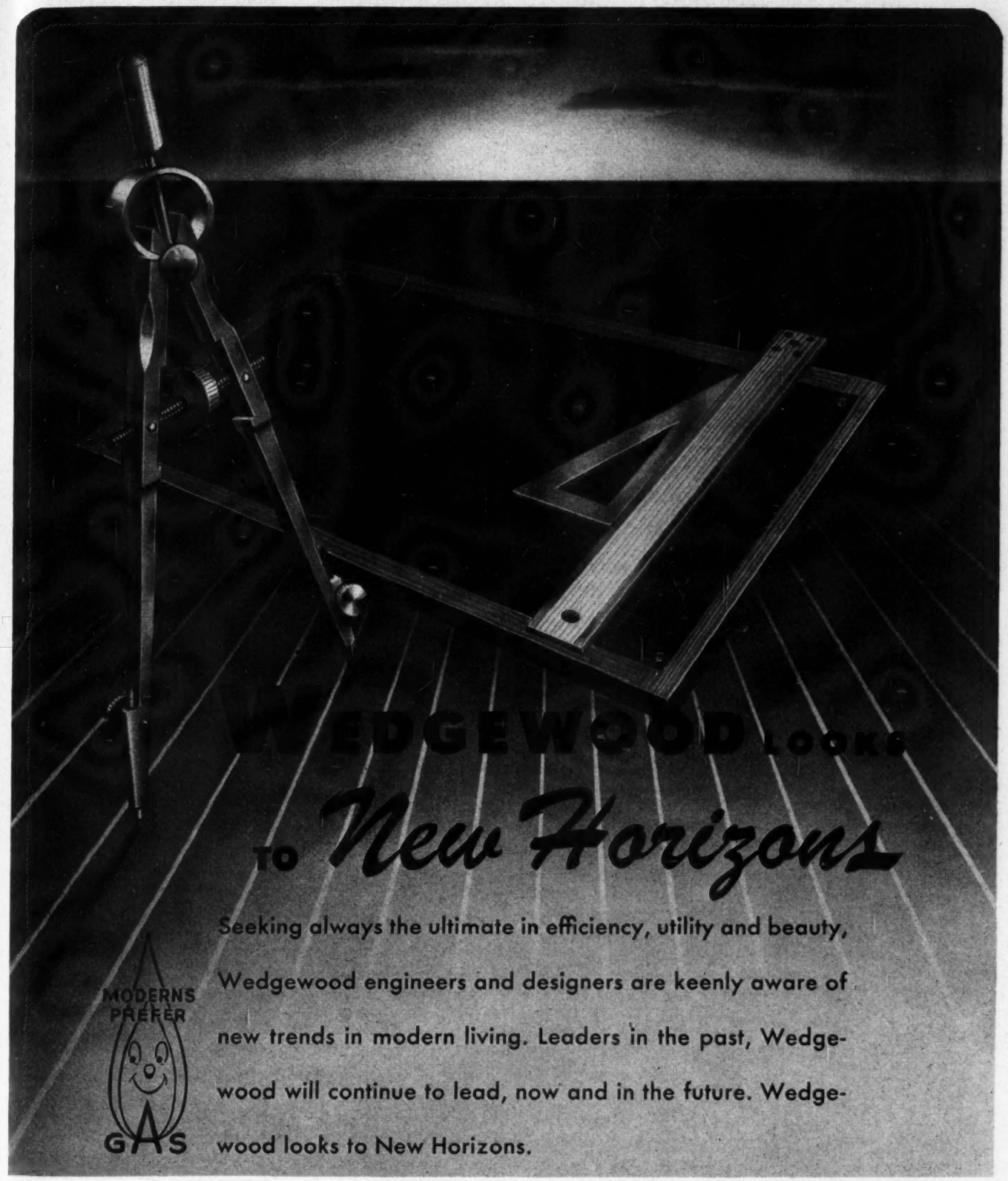
Certificates were awarded at the A. G.A. sales conference on Industrial and Commercial Gas in Toledo, March 30, to men whose services have made outstanding contributions to the Industrial and Commercial Gas Section. The Industrial and Commercial Hall of Fame was created for those who have served as chairman of the section or have accumulated a total of 25 points according to a service point system set up by the section.

Domestic Research Delegates Visit A.G.A. Laboratories

Following the Domestic Gas Research Technical Conference in Cleveland, 50 visitors were shown through the A.G.A. Laboratories. They represented manufacturers and utilities from New England to Texas and from Canada. C. E. Bloome, Purdue University, and M. F. Knoy, Institute of Gas Technology, both of whom appeared on the conference program, were among the visitors.

L-P Gas Association Opens Chicago Headquarters

Howard D. White, newly appointed vice president of the Liquefied Petroleum Gas Association, has announced that a national headquarters office has been opened at 11 South La Salle Street, room 1130, in Chicago. This action is in accordance with an executive vote taken last month.


WEDGEWOOD LOOKS
TO New Horizons
Seeking always the ultimate in efficiency, utility and beauty, Wedgewood engineers and designers are keenly aware of new trends in modern living. Leaders in the past, Wedgewood will continue to lead, now and in the future. Wedgewood looks to New Horizons.
MODERNS PREFER
GAS

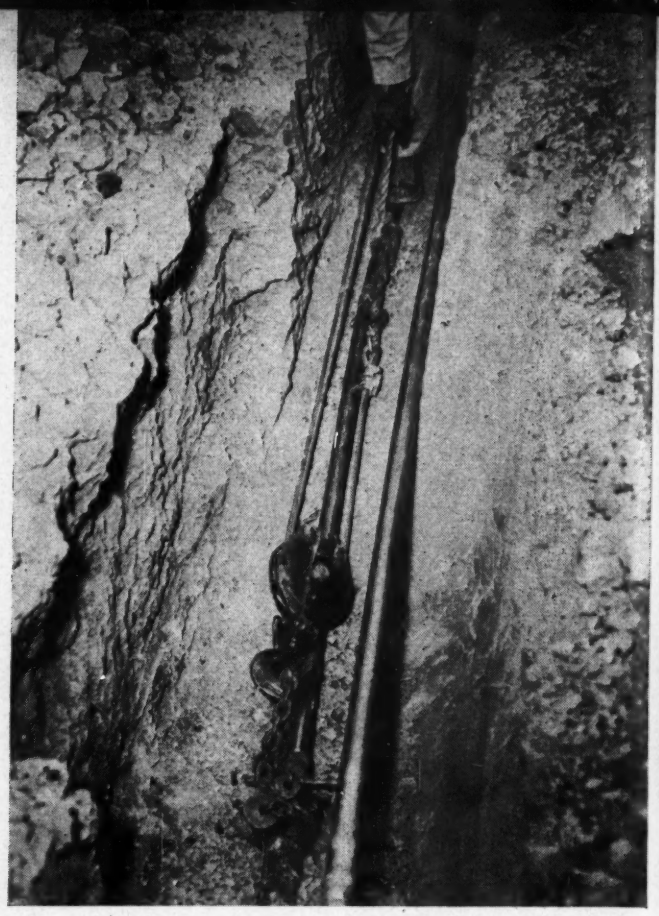
FOR ALL GASES, INCLUDING LP (LIQUEFIED PETROLEUM) GAS

WEDGEWOOD THE MODERN GAS RANGE

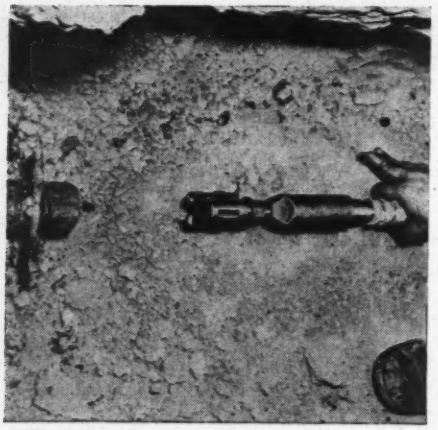
JAMES GRAHAM MANUFACTURING CO.

LOS ANGELES ★ SAN FRANCISCO ★ NEWARK, CALIFORNIA ★ PORTLAND, OREGON

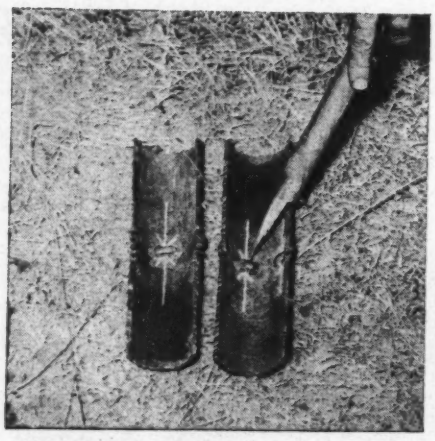
Workmen are inserting the copper tube into end of main. Compressor to operate tube cleaner motor is mounted on truck.



By a system of pulleys and cables attached to a compressed air winch, the copper tubing is forced through the old main.



The tube cleaner, connected to the copper tubing by a pipe nipple is inserted into the old main.



Welding burrs made it impossible to force the copper tube through the old pipe until this method was devised.

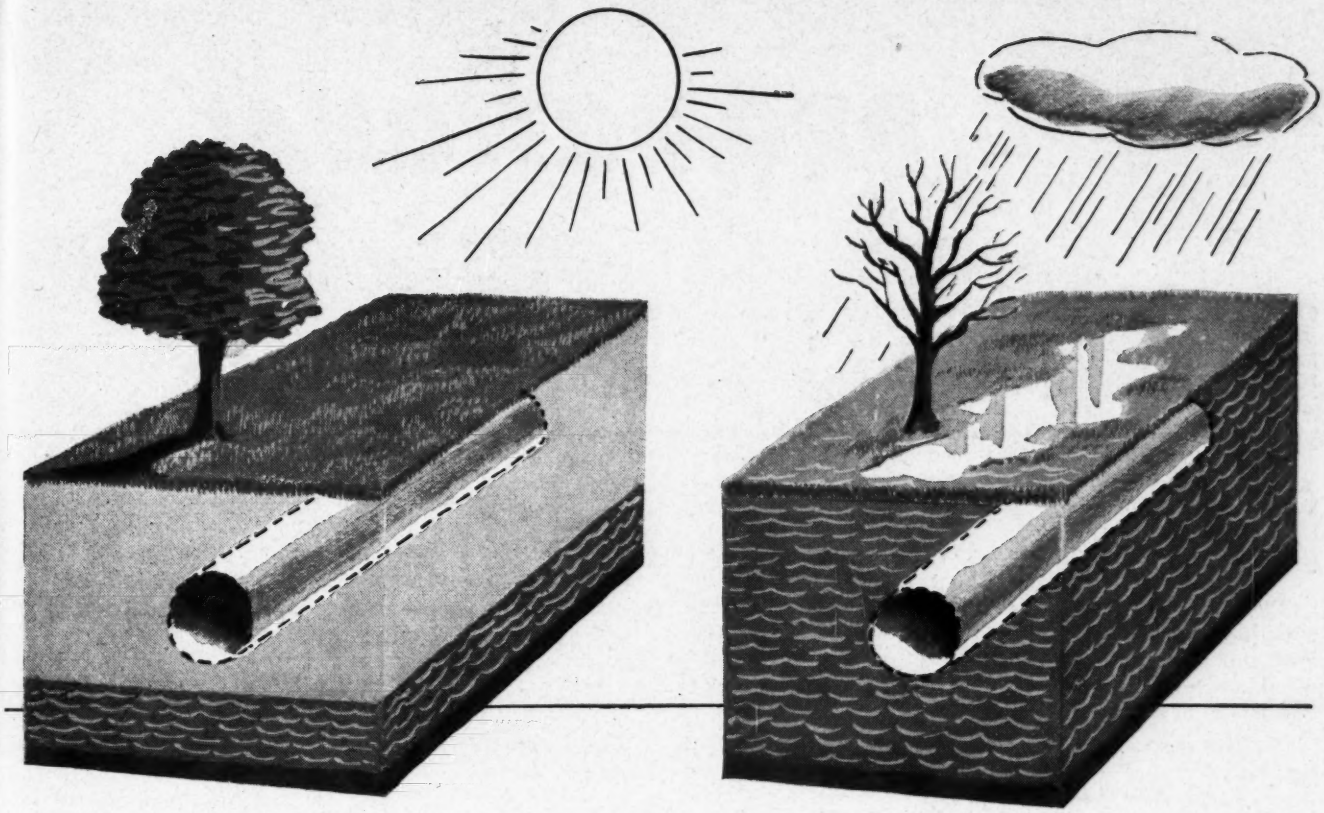
Pipe Replacement Method Decreases Trenching

A NEW method for rejuvenating worn out and leaking gas mains, without the necessity of making extensive excavations, was recently devised by Southern Counties Gas Co. In cooperation with the engineers of the Elliott Co., Jeannette, Pa., the company has developed new equipment for earth boring and pipe replacement.

The new earth-boring equipment, which has been put into use in all Southern Counties districts, is designed to bore under streets and highways for distances up to 100 ft. Gas pipes can then be run through the underground holes without having to dig up heavy surface paving. By means of a sighting apparatus, the bit tipped drill is first carefully lined up through a gun barrel-like tube. A compressed air motor then rapidly revolves the drill pipe, while water under 100 lb. of air pressure washes out the loosened earth. The entire boring operation takes but a few minutes, after which the service may be connected.

Actual pipe replacement methods have been greatly simplified by the development of an improved technique. Instead of digging a new trench and laying new pipe, copper tubing of a smaller diameter than the pipe to be replaced is pushed through the old pipe. Where no sharp bends are involved, up to 1000 ft. of copper tubing can be installed with only about 30 ft. of trenching.

Several problems, such as scale and rust accumulated inside the old mains and welding burrs in the old pipe, were encountered in attempting to insert the copper tubing by means of an air-driven power winch. The solution was found in the use of an Elliott-Lagonda air-driven motor, fitted with a cutting head. This motor was attached to a ¾-in. nipple, brazed to the end of the copper tubing. The air to operate the motor was delivered through the length of the tubing from a compressor mounted on a gas company truck. Hard steel cutting wheels spinning at approximately 2000 rpm cut away the welding snags and cleared inner pipe obstructions so the copper pipe easily could be pushed through with the air powered winch.



Stability of Electrical Resistance of Coal-tar Enamel an important factor in THE ECONOMICS OF CATHODIC PROTECTION

Corrosion-proof pipelines demand the use of stable electrical insulation—Coal-tar Enamels—to permit the economical use of Cathodic Protection.

Coal-tar Enamels, because of their ability to resist moisture absorption, provide constant, uniform and long-lasting STABLE insulation. They are not affected by the changing moisture content of soils, due to variation of seasons and weather conditions.

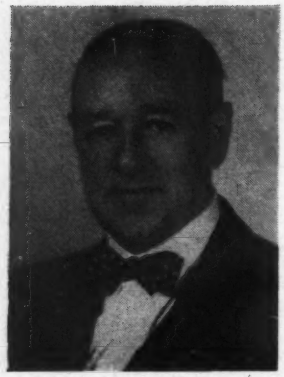
Pipelines—efficiently protected with Coal-tar Enamels—do not require a robot, or any especially designed equipment, to vary automatically the amount of electrical current required with the change in moisture content of soils, to make Cathodic Protection function properly.

Stability of Electrical Resistance of Coal-tar Enamels saves money and helps to reduce the cost of installing Cathodic Protection equipment. Barrett Coal-tar Enamels have demonstrated their effectiveness through years of service in all types of soils and climatic conditions. Applied by modern methods in the field or mills, and electrically inspected, they are your assurance of sound economy.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

FIELD SERVICE: The Barrett Pipeline Service Department and staff of Field Service men are equipped to provide both technical and on-the-job assistance in the use of Barrett Enamel.

Barrett COAL-TAR ENAMEL



PROMOTIONAL NOTES and NOTIONS

By STANLEY JENKS

Out of the Red

In a recent letter to this page, a Texas gas executive is very properly concerned about the automatic reduction of gas rates which goes with inflation. The present situation, with or without rate increases, just puts more heat on our sales departments to create new load—all that experience, ingenuity, and well organized sales effort can devise.

Our Texas friend states that "we will all have to ask for higher rates sooner or later if this inflation continues; and all expense items will be closely examined by the regulatory bodies." Especially "red" merchandising figures.

Of course, I think it is worse than inexcusable—it is sheer folly—for any utility merchandise sales department to be operating in the red. Even those hidebound isolationists, who, to Hades with their local appliance dealers, are repressing all gas appliance sales but their own for the greater glory of their own individualism, are rubbing it in with a vengeance when they come up with red figures. All merchandise sales should stand on their own feet. If an appliance cannot be sold at a profit, it either should not be sold or the resultant load should justify a new business expenditure. Every public service commission in the United States recognizes that a public utility is entitled to spend money to develop its business. This is a perfectly proper operating expense. About 3% of gross seems to be an outside acceptable amount, though I knew one utility sales executive whose rule of thumb on new business expense for an appliance sale was one-half the estimated annual gross revenue the appliance produced.

But, getting back to merchandising in the black, it can be stated, with little fear of contradiction, that more dealers have howled to high heaven about "unfair" utility merchandising practices on the basis that they couldn't compete because utilities sold merchandise at a loss, charged to operating expense.

"Red" merchandising is everything that good public relations are not.

Market Surveys

In the immediate future, until the "pent-up" demand (?) is met, the problem is going to be the relatively simple one of getting the appliances as fast as they can be installed in the homes of anxious purchasers. In other words, it can be reasonably expected over the next two years at least, the major sales objective will be to meet the demand. Potential productive capacity is such, however, and time flies so fast these days, that one of these fine mornings—maybe sooner than we anticipate, if strikes continue to drain away normal purchasing power—the old utility sales technique of creating, rather than meeting demand, will be called for.

In creating a demand for anything, the first essential is knowing where and when to start. Hence market surveys.

I would be the last person in the world to deprecate the value of an intelligent study of sales possibilities. An intelligent study is essential, but from past experience with many such alleged market surveys, I have my fingers crossed on the real value of most of them, which really are nothing more than highly elaborated economic hooey.

A smart sales manager has accurate information at his finger tips all the time. Otherwise, how can he gauge his department's activities to do a maximum job at minimum cost? What added revenue will an automatic water heater produce? How many can be—not should be—sold? Where can they be sold, and how much can the utility afford to pay in promotional expense for their sale, no matter by whom? How can this money be allocated to get the best results? Those are a few of the questions that arise, and which can only be answered from facts, and not surmises or hunches.

At the present time, because there is no immediate need for such information, its importance is apt to be forgotten, but the day is coming when it will be very much needed, and that day should be anticipated now.

House Heating

One of the best efforts ever organized by the gas industry was that of the A.G.A. Post War Planning Committee, A. M. Beebee, chairman.

The committee really did a job for which an appreciative industry cannot ever be too grateful. The committee said what it was going to do, and then went ahead and did it.

For example, in 1943 at Raleigh, North Carolina, J. W. West, Jr., as secretary of the committee, announced among other objectives "An up-to-date study of the present and future economics of the house heating load." The study was obviously primarily for the manufactured gas industry.

Hall M. Henry, a member of the committee, in 1945 authored a study entitled "Factors Relating to Economics of House Heating." It is an excellent job, as fundamentally sound as facts intelligently applied can make it, and its value to the manufactured gas industry is beyond appraisal, because it is one of those very few-and-far-between reports which does not laboriously prove the obvious.

Sales Pointers . . . on New GAS Appliances

SERVEL GAS REFRIGERATOR

Manufacturer: Servel, Inc., Evansville, 20, Ind.

In selling the Servel gas refrigerator, it is necessary to stress more than the fact that the Servel has no motor or other moving parts. It is necessary to stress the things about motorless refrigeration—its points of difference—that offer tangible benefits to the owner. In other words, you must "sell the result, not the cause." Servel's points of difference from other types of automatic refrigeration are restatements in terms of positive benefits and advantages which a user derives from motorless refrigeration.

1. One of the most important basic points of difference is *permanent silence* with no motor or other moving parts. There is no way for the Servel to make noise. The total degree of permanent silence offers the user proven benefits to comfort and health for herself and her family.

2. Another basic point of difference is *continued low operating cost.* This is an important point to stress in selling the Servel gas refrigerator, because the prospect can be assured that he will never be faced with increasing operating costs for Servel has no moving parts to wear and to lose efficiency. Thus the prospect who has this point fully explained to him, can be assured of monthly savings as a result of continued operating economy; the security of knowing that, in future years, the refrigerator will not cost a penny more to operate; and the assurance that his budget will never be thrown out of balance by unanticipated large increases in the operating cost of his refrigerator.

3. A third point of difference to be stressed with the consumer is the benefit of a *long life*, for operating records have shown that, in motorless refrigeration, there are more years of dependable service than with any other domestic refrigerator.

4. *Maintenance expense* is an important point because the customer can be assured that, with motorless refrigeration, he gets freedom from costly wear. Briefly, there are two phases to this freedom from costly wear, and they are:

a. No replacements or repairs of worn moving parts

b. No service cost for the adjustment of moving parts

5. It is very important that the salesman should also stress the *minimum service expense* enjoyed by the user of gas refrigeration. It should be pointed out to the customer that there are no valves, relays, starting switches, or automatic cut-offs in Servel's freezing system to require periodic adjustments: hence, there are no big service bills. Because of this, the customer is also assured of a freedom from interrupted service due to refrigeration breakdown. Because of the wartime experience of a great many owners of mechanical refrigerators, this point is of particular importance. During the entire war period, owners of gas refrigerators have been free from the difficulties that others have experienced in getting service in the replacement of worn, moving parts.

6. In addition to the points of difference already discussed, there is one more which affords to the customer valuable proof of the superiority and desirability of motorless refrigeration. If, for any reason, the customer should wish to dispose of his gas refrigeration, he would be able to obtain *higher trade-in-value* than from any other refrigerator. In pre-war years, the national refrigerator market report gave at least 20% higher evaluation for a used Servel than for any electric refrigerator of the same size and age. This higher resale value is due to the fact that the gas refrigeration system has no moving parts to wear, and thus it is easier for a dealer to resell.

Special Features of Servel Refrigerator Model R-800

1. Automatic inner light.
2. Seven ice cube trays and one dessert tray (all with trigger tray release). Frozen food compartment. Ice cubes, 144. Lbs. of ice, 12.9.
3. Upper tilt shelf.
4. Upper sliding shelf.
5. Covered adjustable meat storage tray.
6. Two-position sliding shelves.
7. Two adjustable glass covered vegetable fresheners (flexible arrangement).
8. Panel temperature control. (Semi automatic or manual defrosting).
9. Full width door with pressure molded plastic door panel.
10. One-piece premium steel cabinet.

Other Features

Grid and cube release
Shelf area—16.08 sq. ft.
Rhythmic-type (flat) shelves
Door opening trim—white
De Luxe door handle

NEW PRODUCTS

Gas Range

The Maytag Co., Newton, Iowa.
Model: Maytag Dutch Oven Range, Model M-5131.
Application: For cooking and baking with all types of gases.
Description: The features of this range which the manufacturer particularly emphasizes are the Dutch cooker-well with three way burner and the

automatic control which turns off the gas and closes the flue vents automatically in response to a previously set timing device, allowing the heavily insulated oven to keep on cooking with the gas turned off. Other advantages claimed for the range are convenient visual height controls above the cooking top out of the reach of children, rigid all-welded steel chassis, perma-finish grates, non-clog burners, roomy storage compartments and pivot action broiler.

Corrosion Test Strips

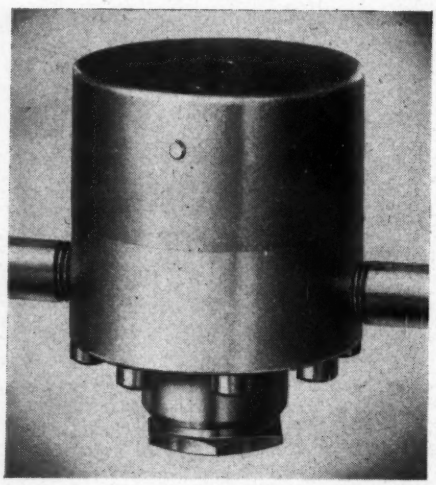
Randall and Sons, 2512 Etna St., Berkeley 4, Calif.
Model: Type C, Bearing Corrosion Test Strip
Application: For use in measuring the 'existent' corrosivity of new and used engine oils toward lead-copper bearings. The test strip will help determine drain periods for oil in service.
Description: The test strip is of copper base 4 in. x .25 in. plated with lead in steps of different thickness. It can be attached to the dipstick or used under controlled conditions in the laboratory.

Sealing Compound

Parker Appliance Co., Cleveland, Ohio.
Model: Uniseal Thread and Gasket Sealing Compound.
Application: Uniseal produces a seal which is proof against air, water, steam, gas, gasoline, oil, hydraulic fluids, and the aromatics. It is virtually insoluble in gasoline, kerosene, Stoddard solvent, benzene, xylene, carbon disulfide, the ketones, acetones and various aromatic aviation fuels. Exhaustive testing shows it to be 100% effective under severe conditions of vibration, and at temperatures above 300° F.
Description: It is a paste of uniform consistency, containing no free metallic particles which might set up corrosion due to galvanic action, or other additives subject to washing out. The compound flows smoothly to form ribbon gaskets and blends readily with cut gasket material. It possesses good anti-seize characteristics which aid in the assembly of threaded fittings. Solubility in alcohol and carbon tetrachloride simplifies cleaning. Uniseal will be available in tubes and containers ranging from 8 oz. to 5 gal.

Pressure Reducing Regulator

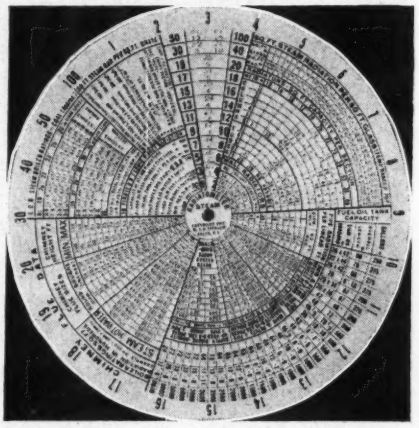
Grove Regulator Co., 65th St., Oakland 8, Calif.
Model: Grove Mity-Mite Regulator.
Application: Suitable for handling initial pressures up to 3500 lb. with adjustable control range from 5 lb. to 1500 lb. with special models for up to 5000 lb. Primarily for air and gases but can be furnished for liquid service.
Description: Stainless steel ports and the homogenous structure of duraluminum give rugged strength. Unique valve and seat construction was especially engineered for positive dead-end shut-off. Instantaneous operation



is featured. The regulator weighs less than 2 lb. and measures roughly 2¾ in. x 3¼ in. Available for ⅛ and ¼ in. pipe size, this tiny unit was developed and proved in wartime service in controlling the actuating medium on rockets and flame throwers. Full details are contained in bulletin 940, available on request.

Heating Calculator

Heat-O-Meter, 424 West 42nd St., New York 18, N. Y.
Model: Heat-O-Meter.
Application: Calculating device for measuring radiation for steam and hot water heating systems. Determines sizes of mains, returns, risers; radiator sizes and capacities; round and



sectional boiler net ratings; chimney flue sizes, capacities and minimum and maximum heights, etc.
Description: This device is a round dial with three concentric celluloid printed discs. It eliminates tedious figuring usually necessary to determine correct amount of radiation and can be used by anyone, without technical training. Computations are made with the large black numbers along the edge of the V-shaped opening and the red numbers that show through it.

Glass Tubing

Fischer & Porter Co., Glo-Tech Glass Division, 96 County Line Road, Hatboro, Pa.
Model: Glo-Tech Precision-Bore Glass Tubing.
Application: Absorption cells, graduated burettes and other volumetric glassware, manometers, barometers, viscometers, polarimeter tubes, moulds, Ramon tubes, flow restriction nozzles and other glass instruments where precise internal dimensions are critical.
Description: Vastly superior to imported products, the accuracy of these tubes may be controlled to within .0002-in. There is a large range of sizes, a variety of shapes, and visibility is provided without sacrificing strength.

Gum Filter

Bryant Heater Co., Cleveland, Ohio.
Model: Streamlined Vapor-phase Gum Filter.
Application: For stoves, water heaters, boilers and other domestic gas heating equipment in manufactured gas areas where gum must be removed from the line.
Description: This filter is efficient, mechanically simple and economical. Only five parts are used in the clean-out filter assembly, which has the approval of the American Gas Association.

Living Costs have gone up and UP,

Natural Gas – down and DOWN

Since August 1939 the cost of living here has gone up 35 per cent. In this same period of rising costs the average price of Natural Gas for P. G. and E. customers has dropped 33 per cent.*

**This 33 per cent includes the 10.3 per cent Natural Gas rate cut effective after February 28. There were other Gas Rate cuts in August 1939—in October 1940 and in February 1943.*

At the new reduced rates, the cost of Natural Gas is more than one-third LOWER than it was in August 1939, while general living costs are one-third HIGHER.

For example: Most any household item that cost $3.00 in 1939, now costs $4.05—BUT an amount of Natural Gas that cost $3.00 in 1939 now costs only $2.00.

It is a tremendous job to keep ahead of Northern California's growth and demand for low cost Natural Gas. It takes an experienced organization and a lot of money. But this company is going ahead earnestly and eagerly in the American spirit of giving the public more and better service than ever before.

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

G204-446

PEOPLE

• **R. S. Rheem,** president of Rheem Manufacturing Co., March 7 announced the appointment of **A. Lightfoot Walker** as his executive assistant. Walker has served as general manager of Rheem Australia since the formation of that subsidiary in 1937. Under his management the Sydney plant expanded and others were added at Melbourne and Brisbane. Walker was born in England and studied and worked in Australia and New Zealand. He received his degree in engineering from Sydney.

A. L. Walker

• Two Navy veterans have returned to positions at Consumers Power Co., Jackson, Mich. **Robert F. Simpson,** who first joined the company in 1936, became general safety instructor recently. **Harry G. Dancer** has also been appointed a general safety instructor. He came to Consumers in 1939.

Two other veterans have been appointed dealer coordinators for the company. **Richard Swiat,** recently discharged from the Navy, became dealer coordinator for the Flint division Feb. 1. **Ernest J. Miller,** on military leave in the Caribbean area for three years, holds the same position for the Kalamazoo division.

• The stockholders of Despatch Oven Co., Minneapolis, Minn., recently elected **A. E. Grapp,** founder of the company, chairman of the board of directors. His son, **H. L. Grapp,** was elected president and general manager. The new executive vice president and general sales manager is **F. H. Faber,** who started with the company in 1928 as a stenographer and has worked up steadily. Former secretary **G. M. Lund** became vice president and secretary. **C. P. Doherty,** who was made factory superintendent in 1926, is now factory manager, and **Lloyd Johnson** succeeds him as factory superintendent.

• **J. F. Ray,** director of sales, General Controls Co., 801 Allen Ave., Glendale 1, Calif., recently announced the appointment of **Edward B. Maire** as manager of the Chicago factory branch.

• **S. R. Mathison** has been appointed West Coast manager for the Youngstown Kitchens division of Mullins Manufacturing Corp., Warren, Ohio, after having served as regional manager in New England since 1940. His headquarters are at Redwood City, Calif.

• **Albert L. Tossell,** vice president in charge of customers service, Peoples Gas Light & Coke Co., retired from his official duties on Feb. 28. Tossell, the second man in the history of the company to reach his 50th year with the organization, started as a clerk at the company's original office. **Phillip E. Eddy,** assistant vice president in charge of customers service, was elected vice president of that division at the regular meeting of the board of directors.

• **Joseph V. Colley** has been named treasurer of the Pittsburgh division, Columbia Gas and Electric Corp. Colley joined the Columbia System Binghamton group in 1939. Effective April 1, the Binghamton group companies will be transferred to the Pittsburgh group with Colley as treasurer of the combined properties.

• At the annual meeting of the Florence Stove Co., **F. J. Hoenigmann** was elected executive vice president and director. He will be in charge of operations of factories in Gardner, Mass., Kankakee, Ill., and Lewisburg, Tenn.

F. Hoenigmann

Hoenigmann has been executive vice president and general manager of the Cribben and Sexton Co., Chicago, for six years and had formerly been sales manager of the company for 10 years. He is chairman of the Gas Range Division of the American Gas Association and is a director of the GAMA.

R. L. Fowler was re-elected president and chairman of the board. **H. O. Berry,** manager of the Gardner factory, was elected a vice president, and **Vice President W. T. MacKay,** head of the Kankakee plant, was made a director. Other officers re-elected were: vice presidents, **H. H. Morse** and **G. B. Colburn;** treasurer and secretary, **A. E. Luke;** assistant treasurer, **B. O. Ashworth.**

• **H. A. Van Hala** has been appointed district manager of the Cleveland branch office of The Bristol Co. **H. E. Beane,** sales manager, in making the announcement, stated that Van Hala is being transferred from the Birmingham branch office where he has been district manager since 1935.

H. H. Bristol, president of The Bistol Co. of Canada, Ltd., has announced the appointment of **Charles Webber** as managing director.

• **John F. Gardner** has succeeded **James P. Kneubuhl** as advertising manager of The Fluor Corp., Ltd. Kneubuhl is now district engineer in the Los Angeles office.

• **Frank B. Long,** vice president, Oklahoma Natural Gas Co., Tulsa, has retired from the company after nearly 20 years of service.

• **Don Fitzgerald** has been appointed assistant to **Ray Ratliff,** advertising manager, Kansas City Gas Co.

• **Arthur L. Blakeslee,** president, Kalamazoo Stove and Furnace Co., has announced the appointment of **Charles R. Reeves** as works manager. Reeves will manage both of Kalamazoo's recently redesigned plants. He joined the organization in 1942 to manage production of parachute flares under government contract, and later turned to post war planning—assisting in the layout of the plants he will now manage. Reeves was formerly production engineer with Associated Engineers of Fort Wayne, Ind., was production manager of Rayon Machinery Corp., Cleveland, and was earlier associated with Link Belt Co., Indianapolis.

• **Richard H. Hinckley** has been named general sales manager of the General Water Heater Corp. following his recent return to the company after three years' service in the Navy. It was also announced that **"Chick" Taylor** and **Robert McKee** have joined the sales staff of General.

• **Alexander M. Beebee,** vice president, Rochester Gas & Electric Co., was initiated into the "College of the R. G. and E." at a recent ceremony celebrating Beebee's thirtieth year with the company. **President Herman Russell** presented the diploma.

• **W. S. Keenan,** residential and commercial sales manager, Houston Natural Gas System, has announced the appointment of **Frank Glenney** as dealer-coordinator. He will coordinate all sales and promotional activities engaged in jointly by Houston Natural and its cooperating dealers, and will assist the latter in merchandising gas household appliances.

• **Walter P. Davis** has been appointed managing director of the Indoor Climate Institute, Detroit, according to an announcement by **T. A. Crawford,** president. The ICI is composed of leading manufacturers in the heating, cooling and air conditioning industries

• **John J. Winn, Jr.,** commercial manager for the Portland Gas & Coke Co. before the war, and vice president in charge of industrial analysis and market research of the First National Bank of Portland since his return from the service several months ago, has been elected vice president and general manger of the Honolulu Gas Co. His appointment is retroactive to March 1.

J. J. Winn

A graduate in chemical engineering at the Massachusetts Institute of Gas Technology, Winn came to Portland Gas and Coke in 1936 as commercial manager. He served during World War I as a top sergeant in a field ambulance company. In 1942 he was commissioned a major in the Army engineers,

• **Frank J. Kohut** was recently promoted from sales-engineering supervisor to sales manager of The C. M. Kemp Manufacturing Co., Baltimore, according to **W. Wallace Kemp,** president.

• **George D. Wilkinson,** chairman of the board and president of Cribben and Sexton Co., Chicago, has announced the appointment of **William M. Hillborn** as executive vice president and director, effective April 1, 1946.

W. M. Hillborn

Hillborn comes to Cribben and Sexton after 20 years experience in the operating and administrative divisions of Sears, Roebuck and Co. Prior to associating with Cribben and Sexton he carried the responsibility for the operating results of all mail order plants, working directly with the general managers and operating superintendents of 10 Sears plants. An expanded merchandising program is being planned by Cribben and Sexton.

• **E. K. Hampel** returned recently from the Army Air Corps to his position as general sales manager of Odin Stove Manufacturing Co., Erie, Pa. He has announced several appointments in his organization. **Jack P. Davidson,** Los Angeles, is the new Odin sales representative in southern California, and **P. R. Danford,** San Francisco, will cover northern California.

• **John Solon** was appointed superintendent of the employment department, Peoples Gas Light & Coke Co., Chicago, recently. He was previously assistant superintendent of the personnel department. **Harry Foley,** formerly executive office assistant, personnel department, was appointed assistant superintendent of that department.

• **H. C. Walker, Jr.,** Shreveport attorney who has been general counsel for the Arkansas Natural Co.'s for the past 14 years, was elected to the presidency of the Arkansas Natural Gas Corp. at a recent meeting of the board of directors in New York City.

• **G. H. Gaites,** regional sales supervisor of the Cleveland and Pittsburgh sales territories of The Bristol Co., Waterbury, Conn., has been appointed district manager of the company's New York office according to **H. E. Beane,** sales manager.

• **George Sellers** was elected secretary and assistant treasurer of the Dayton Power and Light Co. at a recent meeting of the board of directors.

• **Robert A. Mitchell** has returned to his position as sales promotion and advertising manager in the general office sales department, Louisiana Power & Light Co., after four years in the Army.

• **Frank Fiedler** and **Walter J. Gay,** who have been serving in the Navy since 1942, have returned to the staff of the American Gas Association Testing Laboratories, Pacific Coast branch.

• Following almost 28 years of service, **B. M. Nowery** retired as vice president and director of Union Producing Co. and of United Oil Pipe Line Co.

• **Alice R. Hoon** has been appointed home service director of the Cumberland and Allegheny Gas Co., Cumberland, Md., according to a recent announcement by **C. G. Robbins,** district manager.

• At a recent meeting of the San Diego Gas and Electric Co. board of directors, **J. M. Dourus** was elected to the position of vice president and treasurer. He became treasurer in May, 1945, upon the retirement of **M. B. Fowler.** Dourus has been employed by the company since 1918, was made assistant auditor in 1924 and became general auditor in 1934. Prior to coming to the San Diego utility he was employed by the Oklahoma Gas and Electric Co.

• **A. H. Weyland,** vice president and general manager of the Arkansas Natural Gas Corp., has been promoted to the office of president and general manager of the three operating companies which comprise the Arkansas Natural Co.'s—Arkansas Louisiana Gas Co., Arkansas Fuel Oil Co., and Arkansas Pipeline Corp.

• **Gordon Rieley,** vice president of Bryant Heater Co., has been appointed director of the newly established building and construction price division of the Office of Price Administration, and is on leave of absence to assume his new duties immediately, it is announced by **Lyle C. Harvey,** president.

NOW IS THE TIME To Convert That Plant To Liquefied Petroleum Gas

Now is the time to convert small city gas distribution systems to Liquefied Petroleum Gas — for more profitable operation.

Adequate supply of Warren Liquefied Petroleum Gas is available for use by utility gas plants.

Because of the growing need for low cost, dependable gas supply in small cities, many operators are now converting their plants. Liquefied Petroleum Gas plants operate automatically and assure an adequate supply of uniform quality regardless of load.

The broad experience, engineering advice and consulting service of Warren's trained organization are available to you without obligation.

WARREN PETROLEUM CORPORATION
TULSA, OKLAHOMA
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PIPE LINE NEWS

• The Federal Power Commission began a consolidated hearing March 11 in Washington, D.C., to consider two applications filed by **Kentucky Natural Gas Corp.** asking authority (1) to construct a new pipe line to receive a supply of gas from **Tennessee Gas and Transmission Co.**, and (2) to build an additional pipe line to serve **Indiana Gas and Water Co., Inc.**

The proposed facilities, estimated to cost $458,840, include about 18 miles of 10¾-in. transmission pipe line extending from near Russellville, Ky., to the vicinity of Mitchellville, Tenn. which will provide a new interconnection with the transmission system of Tennessee Gas and Transmission Co., and approximately 30 miles of 6-in. pipe line from a point on the transmission line of the Panhandle Eastern Pipe Line Co. to a point of connection with Indiana Gas and Water Co., Inc., near Martinsville, Ind.

• The **Mid-Continent Gas Transmission Co.**, Wilmington, Del., has filed an application with the FPC for authority to construct and operate a 400-mile 26-in. main transmission pipe line from the Hugoton gas field beginning near Liberal, Kan., to the city limits of Kansas City, Mo., with construction to be completed by November 1946. The initial cost of the proposed line, including gathering lines, field compressor units and auxiliary equipment, is estimated at $25,620,000.

According to the application, Mid-Continent is negotiating with producers in the Hugoton field for purchase contracts to enable it to supply gas at wholesale to distributing companies and industrial customers doing business in and around Kansas City, Mo., and Kansas City and Wichita,

• The FPC has received (1) an application from **Hope Natural Gas Co.**, Clarksburg, W. Va., requesting authority to construct and complete by Dec. 1, 1946, 143 miles of pipe line and a number of major additions to its present transmission system in West Virginia in order to meet the alleged increasing demands of its wholesale customers, principally **The East Ohio Gas Co.**, an affiliate, and (2) an application filed by The East Ohio Gas Co., Cleveland, for permission to construct a 144-mile pipe line extending from Hope's outlet at the Ohio-West Virginia state line to the outskirts of Cleveland.

• Immediately following the settlement of the steel strike, engineers of **Northern Natural Gas Co.** have taken action to secure 15-in. piping for gas lines to Saskatoon, Sask.

• **The Cincinnati Gas Transportation Co.**, Charleston, W. Va., an affiliate of **Columbia Gas & Electric Corp.**, has requested permission from the FPC to construct and operate an additional pipe line in Kentucky to augment facilities for delivery of natural gas to **The Cincinnati Gas & Electric Co.** and **The Union Light, Heat & Power Co.** The cost of the proposed undertaking, to be completed by Nov. 1, 1946, is estimated at $1.5 million.

The proposed 14-in., 70-mile line will extend from Cincinnati Gas Transportation's 20-in. line near Foster, Ky., to connect with the 24-in. line of Tennessee Gas and Transmission near Means, Ky., and will be used only to serve present customers.

• The Federal Power Commission has received an application filed by the **Trans-Continental Gas Pipe Line Co., Inc.**, Longview, Texas, for (1) authority to convert the "Big Inch," the "Little Big Inch" and the "Southwest Emergency" pipe lines to the transportation of natural gas to Pennsylvania, New Jersey and New York, or (2) permission to construct a comparable pipe line system for gas transportation.

• **Lone Star Gas Co.**, Dallas, has begun construction of a 79-mile pipe line to tie the gas field near Carthage into the company's 5000-mile network of transmission mains. The new 14-in. line will secure additional gas reserves for the company and strengthen the gas supply for Fort Worth and nearly 300 other towns and cities served by Lone Star in Texas and Oklahoma.

• Hearing commenced March 22 in Washington, D. C., on a joint application of the **Iroquois Gas Corp.**, Buffalo, N. Y., and **United Natural Gas Co.**, Oil City, Pa., for authority to construct about 20 miles of 16-in. loop line from McKean County, Pa., to Cattaraugus County, N. Y.

• Hearings began March 27 in Washington, D. C., on three applications of **Arkansas Louisiana Gas Co.** for authority to operate transmission facilities constructed to meet wartime emergencies under temporary FPC authorization, to construct additional facilities, and to remove a portion of two 4-in. lines near Little Rock which will no longer be used. The new construction is estimated to cost $530,391.

• The FPC has authorized **Northern Natural Gas Co.**, Omaha, to construct and operate facilities that will increase the delivery capacity of the company's gas pipe line system to its market area north of Clifton, Kan., from an estimated 260 MMcf to 270 MMcf of gas per day. The facilities will cost about $1,407,748.

• The Federal Power Commission has set April 8 for a further hearing in Los Angeles in the proceedings on the applications of **El Paso Natural Gas Co.**, El Paso; **Southern California Gas Co.** and **Southern Counties Gas Co.**, both of Los Angeles, for authority to construct facilities to transport natural gas from Texas and New Mexico gas fields to the Los Angeles area.

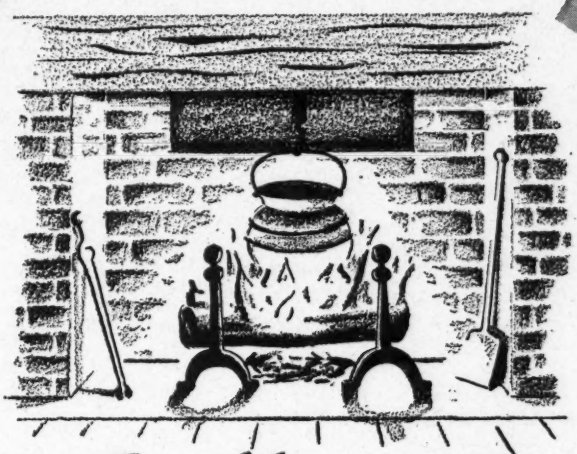
Yes, indeed—"Okay! She's through"—is the word-picture of the fast-moving *Hydrauger* performance. *Hydrauger* bores open-hole for underground pipe installations almost as easily as a hot knife goes through butter. The finished *Hydrauger* bore is clean, and straight and just over pipe size; all of which not only simplifies pipe installation but also avoids disturbing the natural compaction of the surrounding soil. Coated, wrapped, or bell-and-spigot pipe eases through open *Hydrauger* hole without forcing or damage.

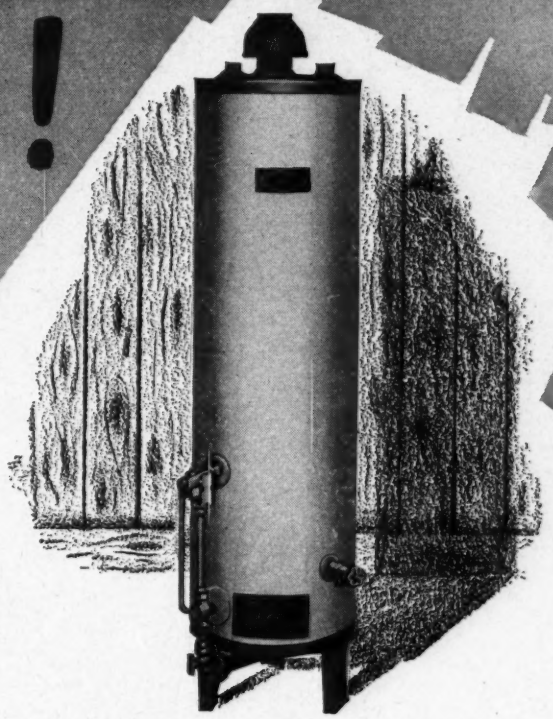
The **Hydrauger** operates on 90-pounds air pressure, and uses sufficient water to flush back cuttings from the bit and to "mud" the hole against sloughing. New hi-powered models bore 2½ to 14½ inch holes **fast.** Write for engineering data and illustrated booklet today

HYDRAUGER

HYDRAUGER CORPORATION, LTD.
116 NEW MONTGOMERY STREET
SAN FRANCISCO, CALIFORNIA

HOT WATER!





The Hard Way

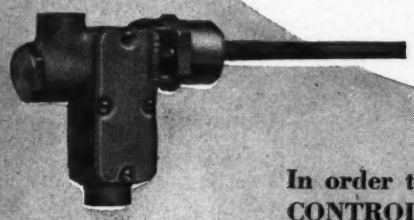
In great grandmother's day water was heated over an open fire — in the fireplace for cooking purposes — outdoors for laundry, butchering and other tasks requiring lots of hot water. Heating the water was a job in itself.

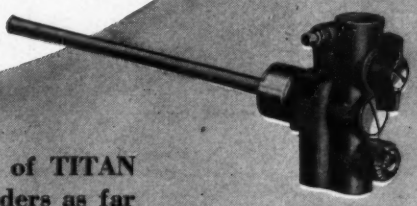
The Easy Way

Nowadays the modern housewife just turns the faucet and has plenty of hot water for all purposes from an Automatic Hot Water Heater—without work for onyone. This is one of the greatest labor saving achievements of the last 100 years.

Millions of additional homes will be equipped with Automatic Hot Water Heaters during the next few years. Be sure your customers get the best installation possible by equipping your heaters with

TITAN
WATER HEATER CONTROLS





In order to be sure of adequate supplies of TITAN CONTROLS we suggest that you place orders as far in advance of your needs as possible.

THE TITAN VALVE & MANUFACTURING COMPANY

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CURRENT READING

How To Get Ideas. Elliott Service Co., 219 East 44th St., Dept. S182, New York 17, N.Y. Folder on suggestion system techniques describing posters, pamphlets, suggestion blanks, photographs and working forms to help carry out a successful employee suggestion system. Free upon request.

Control Occupational Hazards Through Industrial Hygiene — N. V. Hendricks. "Chem. and Met.", Jan., 1946, pp. 124, 125, 128. Often neglected in plant operations is the control of environmental conditions which adversely affect the health and efficiency of plant personnel. While most chemical engineers are aware of some of these hazards, their critical relation to employee productivity is not always apparent. The purpose of this article is to emphasize the importance of such hazards and to show how the application of industrial hygiene methods can help increase efficiency by protecting workers from undesirable conditions of atmospheric contamination.

Super-Expansibility of Methane-Ethane Mixtures — W. O. Clinedinst. "Oil Weekly," Jan. 28, 1946, pp. 46, 47, 49. Its effect on flow through pipe lines.

Correlating Viscosities of Gases with Temperature and Pressure—D. F. Othmer and S. Josefowitz. "Ind. and Engr. Chem.", Jan., 1946, pp. 111-116. At constant pressure, viscosities of gases and of gaseous mixtures may be plotted directly to give straight lines on logarithmic paper against a temperature scale calibrated from the vapor pressure of a reference liquid. At constant temperature, gas viscosities may be plotted to give straight lines on logarithmic paper against the ratio of the kinematic pressure and the gas density. Methods of correlating gas viscosities, temperatures, and pressures are expanded to allow the estimation of the viscosity of gases under different conditions where their PVT data and the viscosity at one set of conditions are known. A nomograph has been constructed to allow ready determination of viscosities; it is believed that values so determined fall well within the precision of published experimental data. Thermodynamic derivations indicate the theoretical basis of these plots and the resulting nomograph.

Largest Pipe Line Bridge Completes Carthage Outlet—H.A. Hess. "Oil Weekly," Jan. 21, 1946, pp. 33-39. With the completion of what is considered the largest pipe line bridge in the world, United Gas Pipe Line Co. on Dec. 10 put in operation the first major outlet for the Carthage gas field. This 142-mile, 24-in. pipe line extends from United's Carthage gasoline plant, which is nearing completion, to a point of connection with Tennessee Gas and Transmission's system near West Monroe, La. Another outlet from the line serves United's customers in the Monroe, La., area who were faced with curtailment due to the rapid depletion of the Monroe gas field. A map shows the course of the line and also the main features of interest.

Which Specifications for Steel Pipe Shall I Use?—S. Crocker. "Heating, Piping and Air Conditioning," Jan., 1946, pp. 89-98. How is the engineer to determine readily which of the many available specifications should be used for purchasing pipe materials for any given installation or set of conditions? This article, and the consolidated tabulation of chemical compositions, physical properties, and allowable stresses, has been especially prepared to answer this question, and will be found of great value to all who design, specify, or install power piping systems.

The Service of Selling—Kenneth Lawyer. Published by The Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, Ohio. This title covers a set of three books. Volume I—"What is Salesmanship?", Volume II—"The Selling Process", and a companion volume called "Enthusiasm, Personality and Friendships". The books represent the consummation of many years of selling, study of training methods, and experience in the teaching of salesmanship.

Utilization of Propane and Butane—M. M. Perkins. "California Oil World," 1st January issue, 1946, pp. 13, etc. The use of propane and butane as raw materials for the production of motor gasoline is discussed in this article. Various processes are described and illustrated by flow charts.

That's a lot of capacity—an all-welded-panel gas holder more than 1,000 feet high!

So far, we've never found a customer who needed a single holder that big—but we've built them as large as 10,000,000 cubic feet and as small as 100 cubic feet.

However, 60,000,000 cubic feet *is* the total capacity of all these Stacey Brothers all-welded holder installations—an enviable record when you consider this type of construction is comparatively new.

There are good reasons for this overwhelming customer endorsement; Stacey Brothers pioneered the all-welded type of construction. Measuring capacity with "know-how", this 60,000,000 cubic feet of construction represents a wealth of experience—experience that pays off in speedier erection and trouble-free operation.

But there are other important advantages, too—inherent design features. The famous patented Stacey Brothers All-Welded-Panel construction not only licks the problem of internal corrosion behind vertical legs and between laps, but results in a structure that's mechanically round and free of unsightly deformations.

When you need gas-holder capacity, it will pay you to get a quotation and recommendations from Stacey Brothers. No obligation, of course. May we hear from you?

Stacey Brothers TANKS

STACEY BROTHERS GAS CONSTRUCTION CO.
One of the Dresser Industries
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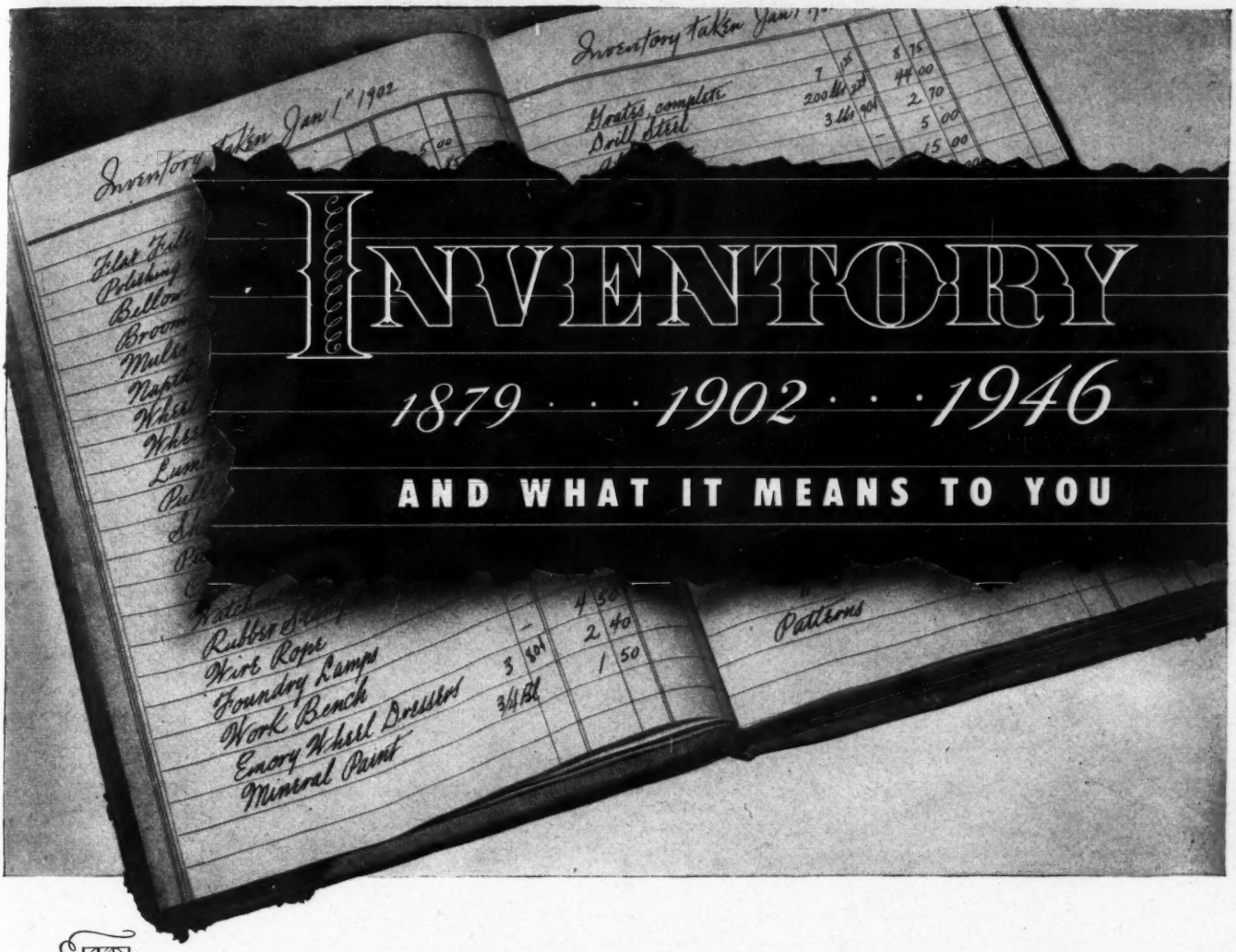

THE 1879 INVENTORY of Hardwick Stove Company has vanished with the years. It evidently consisted of some money, a lot of ingenuity and willingness to work, and a resolve to make good stoves at low cost.

The illustration from the 1901 inventory shows that the sound basic policy resulted in progress in physical assets. Customers who bought Hardwick stoves liked them and recommended them to their friends.

The 1946 inventory shows seven large, modern, well-integrated plants at Cleveland, Tennessee, chock full of the most modern time and cost saving equipment yet devised. But Hardwick considers physical assets valueless as compared to the large inventory of customers throughout the nation who like Hardwick gas ranges and recommend them to their friends. That is the asset which Hardwick considers of real value to Hardwick and to Hardwick dealers. Hardwick builds and will continue to build gas ranges that equal in performance the highest priced ranges—produces them efficiently in large volume at a price that people can pay. People like the superlative performance of Hardwick gas ranges, they like the beautiful and functional designs that stand so well the test of time. For Hardwick stoves are sturdily built and give many extra years of trouble-free service.

What does this mean to you in this time when demand far exceeds supply? It means that now is the time to insure your sales future by tying in with Hardwick and resolving to feature the Hardwick line.

HARDWICK
Gas
RANGES

HARDWICK STOVE COMPANY
CLEVELAND, TENNESSEE
The Quality Line Since '79

GAS LEAKAGE CUT 91 PER CENT

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You get Results with CARBOSEAL anti-leak

A 1,700-foot section of a 4-in. main with cement joints carrying dry manufactured gas showed a leakage of 114 cu. ft. per hour before treatment. After treatment with Carboseal anti-leak, the leakage was cut to 10 cu. ft. per hour, a reduction of approximately 91 per cent.

This is one example of the results obtained in more than 6,500 *miles* of gas mains treated with Carboseal.

To get more information write for booklet, "Correcting Leakage in Gas Distribution Systems with Carboseal Anti-Leak."

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CARBOSEAL *Anti-leak*

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Blue Gas Plants	Gas Purifiers
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Canadian Plant May Extract Gasoline from Natural Gas

Construction of a $25 million plant to extract gasoline from natural gas may be undertaken in the northern Alberta area. Alberta government officials state it is significant that vast gas reserves are being obtained in the province by major oil companies, and now several million acres of potential oil and gas lands have been acquired by oil interests. It is believed that the purpose is the ultimate establishment of a plant to produce gasoline by new processing from dry gas.

Last year, more than 4.5 million acres were acquired under exploration leases, while several million acres already are involved in applications filed since Jan. 1. Keen interest has been shown in development work being done by Imperial Oil Ltd. in the Kinsella field, where a number of gas wells are reported.

Provincial officials announced that a reservation on a large tract located between Nanton and Vulcan has been granted to Shell Oil Co. of Canada, Ltd. The area comprises 195,949 acres, on which the company is to do oil and gas exploration work. The gas exploration program being carried on by Imperial Oil is regarded in oil circles as the largest reserve so far indicated on the plains.

Reynosa Hearing Reopened On Exportation to Mexico

On the motion of the Texas Railroad Commission, the FPC has reopened hearings April 1 in Washington, D. C., on Reynosa Gas Pipe Line Co.'s request for authority to transport natural gas from Texas to Monterrey, S.A. Up to 60 MMcf daily is to be used by industries in and around Monterrey.

At the same time, hearings will be held on a supplemental petition of United Gas Pipe Line Co. for permission to continue the sale and exportation of natural gas to Compania Mexicana de Gas, S.A., at an increased rate of 5c per Mcf.

Stone & Webster Acquires West Gas Improvement Co.

Stone & Webster Service Corp. has acquired all of the capital stock of West Gas Improvement Co. of America, Inc., from West's Gas Improvement Co., Ltd., of Manchester, England. At the same time West Gas Improvement Co. of America, Inc., has been made exclusive licensee to build and install, under certain patents owned by the English company, retort benches for the making of gas within the United States and Canada.

Arkansas Western Receives Franchise to Serve Harrison

Arkansas Western Gas Co., Fayetteville, Ark., has received a franchise from the city council for construction of a natural gas distribution system in Harrison, Ark. L. L. Baxter, president, said the company will enter this section of northern Arkansas as soon as possible, but that the critical shortage of pipe line equipment and other materials makes it impossible to fix a completion date for the job.

Water Heating Featured at Portland Gas Meeting

More than 350 merchant plumbers, gas water heater distributors, manufacturers, their wives and sales personnel attended Portland Gas & Coke Co.'s first big postwar sales meeting Feb. 28. The evening began with a buffet supper and featured a dramatized sales presentation and an exposition of the latest in gas water heating equipment.

A score of gas company people participated in a fast-moving preview of the 1946 advertising campaign for automatic gas water heating, which added up to 96 million messages via magazines, radio, newspapers, billboards, etc., and 50,000 personal calls in this area. Each advertising media was represented by a "step" on a "ladder of profit".

The new Gas Water Heater Sizing Chart (**Gas,** Nov. p. 27) developed by the water heater council of the Pacific Coast Gas Association was presented by Clyde H. Potter of Los Angeles, manager of appliance sales for Southern Counties Gas Co. He explained how the new chart, now being distributed, determines hot water needs according to rooms in the home rather than by occupants.

Using as a theme, "60 Gallons in 90 Minutes," C. W. Steele of the Portland Company previewed the hot water requirements of a modern home with its hot-water-consuming automatic devices and told how the inherent speed of modern gas water heaters enables the merchant plumber to meet the challenge.

A. O. Leech, also of Portland Gas & Coke, described new developments in commercial gas water heaters which also enable the merchant plumber to meet increasing demands for hot water for cleaning and sterilizing in restaurants and other volume cooking establishments.

Minneapolis-Honeywell Expands Los Angeles Branch

The Minneapolis-Honeywell Regulator Co. has announced that on Jan. 1 its Los Angeles office at 714 W. Olympic Blvd. was expanded to distribute directly its complete line of products for all industries, including controls for heating, air conditioning and refrigeration, in addition to Brown instruments for industry. This expansion was necessary to conform to a policy of serving every part of the country from branch offices and to accommodate expansion into the aeronautical, railway, and other markets associated with the company's normal channels of trade. G. S. Younkin is manager of the Los Angeles branch.

P.E. Co. Annual Revenues Exceed $100 Million Mark

Philadelphia Electric Co. in 1945 handled the largest volume of business in its history, with operating revenues exceeding $100 million, according to Horace P. Liversidge, president. He stated that total gas sales were 13,481,070,800 cu. ft., an increase of 1.5% over the prior year. Several new records for gas output were established during the year.

R-C dual-ability

means better blower performance

R-C Centrifugal Blowers may be driven by steam turbine or direct connected motor—whichever is best fitted to the installation.

CENTRIFUGAL

R-C Centrifugal Blowers are available in a multitude of sizes of single or multi-stage design, in capacities up to whatever your needs may be.

ROTARY POSITIVE

Where the rotary positive displacement type is better adapted to your needs, no other company can meet the standards set up by R-C equipment . . . the leader in the field for almost a century.

You'll get profitable service from Roots-Connersville Centrifugal Blowers and Exhausters because:

1. Our engineers study your needs in detail before selecting type, speed, drive, number of stages, style of impellers, etc., to insure the unit best adapted to your special requirements.

2. Our plant builds the units with scrupulous care, to close tolerances, with fine machining and finish of the materials best fitted for the work. They check every part, and the final assembly is subjected to rigid tests, before shipment.

Proof of the practical value of this R-C *dual-ability* is found in the many installations of our Centrifugal Blowers and Exhausters. They're being successfully and profitably used in almost every industry. They live up to their guarantees and have unfailingly given excellent performance.

For better blower performance, you can depend on us.

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One of the Dresser Industries
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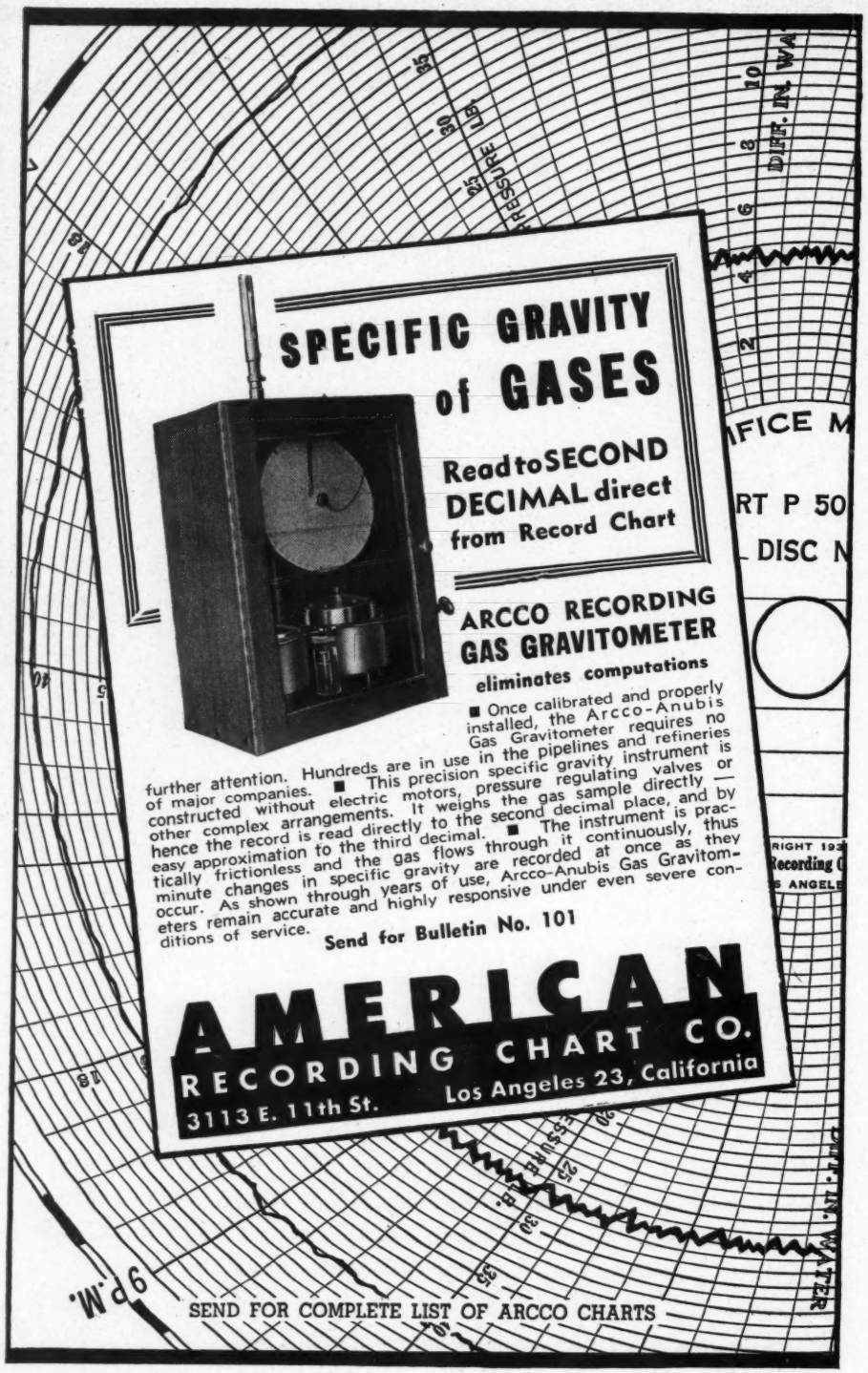
Roots CONNERSVILLE SINCE 1854

CENTRIFUGAL BLOWERS & EXHAUSTERS

ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS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of GASES
Read to SECOND DECIMAL direct from Record Chart
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eliminates computations
■ Once calibrated and properly installed, the Arcco-Anubis Gas Gravitometer requires no further attention. Hundreds are in use in the pipelines and refineries of major companies. ■ This precision specific gravity instrument is constructed without electric motors, pressure regulating valves or other complex arrangements. It weighs the gas sample directly — hence the record is read directly to the second decimal place, and by easy approximation to the third decimal. ■ The instrument is practically frictionless and the gas flows through it continuously, thus minute changes in specific gravity are recorded at once as they occur. As shown through years of use, Arcco-Anubis Gas Gravitometers remain accurate and highly responsive under even severe conditions of service.
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NATURAL GAS CONSULTANTS

So. Counties Employees Receive Added Pay Boost

Employees of Southern Counties Gas Co., Los Angeles, will receive an additional increase in wages retroactive to an adjustment made in November 1945. At that time the company offered a 15% wage increase which the union accepted. Soon after this, Southern California Gas Co., also of Los Angeles, increased the wages of its employees more than the 15% given by Southern Counties.

As a result of further negotiations between the unions and Southern Counties, the following increase will go into immediate effect and will be received in pay checks as soon as the necessary computations can be made. For all payroll classifications receiving monthly rates between $112.50 and $152.50, as included in the agreement of May 1, 1945, an increase of $31.35 is granted. For all payroll classifications receiving monthly rates between $157.50 and $212.50, the increase will be 15% plus $8.50 a month.

On March 15, Southern Counties, through an agreement with the union, adopted biweekly pay days, with half the employees paid on alternate Fridays.

FPC Dismisses Panhandle Request to Serve Ford

The Federal Power Commission announced March 15, its order dismissing without prejudice Panhandle Eastern Pipe Line Co.'s application for authority to construct facilities for sale of natural gas to the Ford Motor Co. and stating that such sale would impair gas service to Panhandle's present customers and is against the public interest.

The application dismissed covered a request filed by Panhandle on Jan. 10, 1946, to construct and operate certain necessary facilities at a point of connection on Panhandle's main transmission pipe line in Wayne County, Mich., for delivery of gas to Ford.

Educational Film on Pipe Available to Industry

The third sound motion picture, produced and made available by Cast Iron Pipe Research Association, is a contribution to good practice in the handling and installation of pipe for underground mains. The film features the journey of a carload of pipe from the stockpile at the foundry to the backfilling of an installation underground. It runs for about 22 minutes and is furnished on 16 mm. film. This film is available to engineering bodies and schools, and to municipal departments, at no charge except the transpotration cost when the film is returned.

New Commercial Standard For Pipe Nipples

The Division of Trade Standards, Department of Commerce, has announced that a new standard for pipe nipples will be effective for production from Feb. 15, 1946. The standard (TS-4062), accepted by a majority of manufacturers, distributors and users, is entitled "Pipe Nipples; Brass, Copper, Steel and Wrought-Iron" and is available upon request.

CRC Approves Increased Deliveries for San Diego

Southern Counties Gas Co. and San Diego Gas & Electric Co. have been authorized by the California Railroad Commission to enter into a contract providing for increased gas deliveries by Southern Counties to San Diego from 26 million to 33 million cu. ft. per day to meet current peak demands in the San Diego area. In addition to commodity rates, the contract calls for a fixed monthly charge of $7500 to cover cost of a new 1000-hp booster station built by Southern Counties at Dana Point, as well as cost of other facilities to increase deliveries.

The contract also provides for a variable credit depending upon volume of gas purchased by San Diego for firm requirements in any 24-hour day. The contract also gives San Diego Gas & Electric an option to buy all San Diego County transmission lines of Southern Counties in the event of termination of gas deliveries or lack of enough available gas to make its use economical.

Brooklyn Union Installs Kitchen Ventilating System

A kitchen ventilating system similar to that developed by the Rochester Gas & Electric Co. has been installed in the Jamaica, N. Y., office demonstration kitchen of Brooklyn Union Gas Co. The system consists of a duct with intake openings above the top burners and near the oven vent. The warm products of combustion, together with vaporized cooking greases, heat, odors and steam are exhausted to the outside air by means of an exhaust fan. The Rochester company reports that it has number of customers using the system, and that after 3½ years' operation they have experienced no grease condensation on kitchen walls or in any part of the ventilating system.

South Atlantic Absorbs Savannah-St. Augustine

By formal action of the directors and stockholders of South Atlantic Gas Co., the name Savannah-St. Augustine Gas Co. no longer exists. There is only one corporation involved, and the name South Atlantic Gas Co. will be used in all notices served except in the cities of Savannah and St. Augustine. In these cities, the company will operate as the Savannah Gas Co. and the St. Augustine Gas Co.

RFC Negotiating Big-Inch Maintenance Contract

The Reconstruction Finance Corp. is negotiating a contract with Williams Brothers of Tulsa to take custodial charge of the Big Inch pipe lines of War Emergency Pipelines, and maintain them in standby condition until further disposition is decided upon by the government.

Gas and Oil Research Is Topic of IOCC Meeting

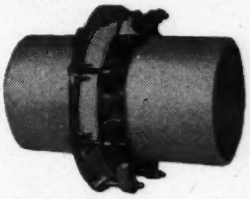
The general theme of the three-day meeting of the Interstate Oil Compact Commission in Tulsa, Okla., April 11-13, will be the advances in recent years in scientific industrial research as applied to oil and gas.

MAJOR U. S. CITIES

CHOOSE DRESSER STYLE 60 CLAMPS

For repairing bell and spigot joints 3" to 60" dia.

HERE'S WHY:



IT'S ADJUSTABLE! IT FITS!
NO SHIMMING...NO GRINDING
IT'S ECONOMICAL! IT'S FAST!

Whatever type of pipe you may find in the hole—foreign or domestic, oversize or undersize, old or new—you can use a Dresser Style 60 Clamp without any delay *because it is adjustable to the exact pipe diameter.* You save time on the job—you get a better job. The special Dresser gasket keeps joint leakproof for life.

Only Dresser offers a complete line of bell joint clamps. Sizes: 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, 30, 36, 42, 48 and 60 inches nominal diameter. Write for full information.

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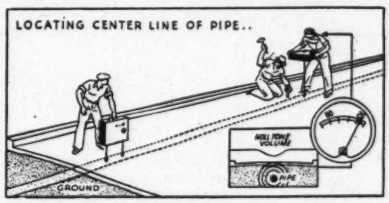
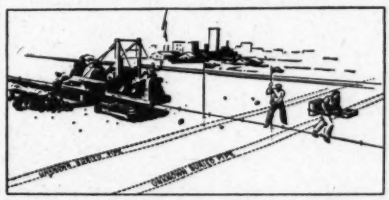
DRESSER CLAMPS

ONE OF THE DRESSER INDUSTRIES





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16 PAGE BOOKLET FREE UPON REQUEST

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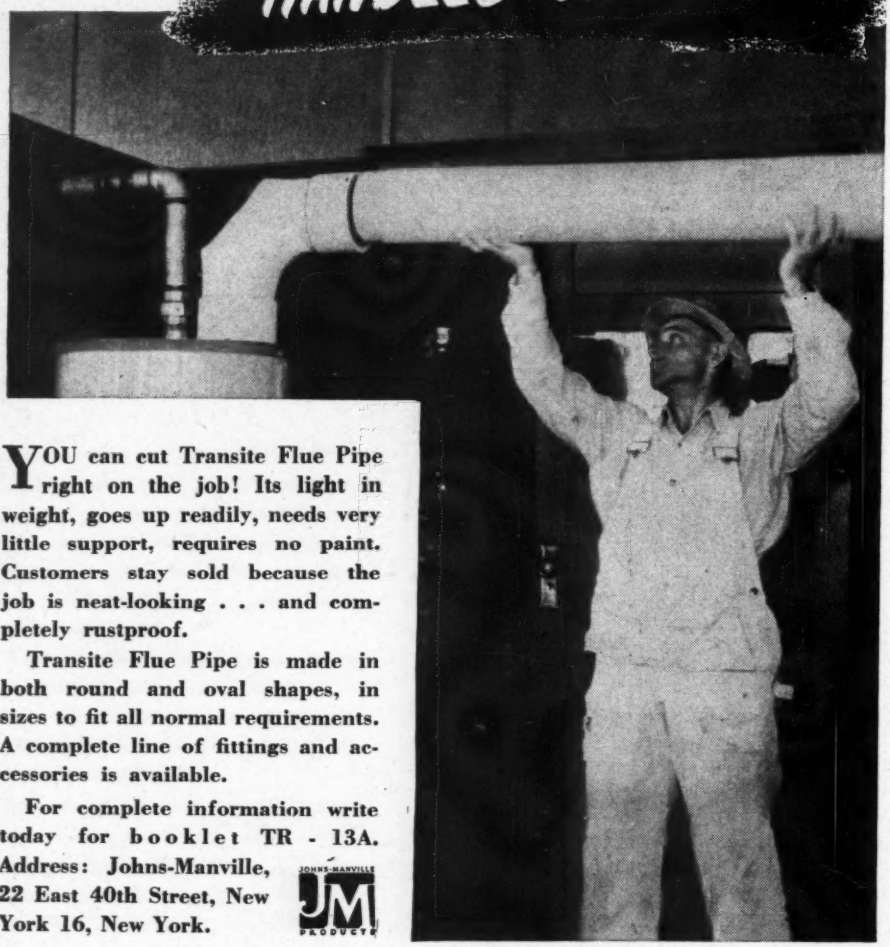
"I like TRANSITE FLUE PIPE because it HANDLES EASILY!"



YOU can cut Transite Flue Pipe right on the job! Its light in weight, goes up readily, needs very little support, requires no paint. Customers stay sold because the job is neat-looking . . . and completely rustproof.

Transite Flue Pipe is made in both round and oval shapes, in sizes to fit all normal requirements. A complete line of fittings and accessories is available.

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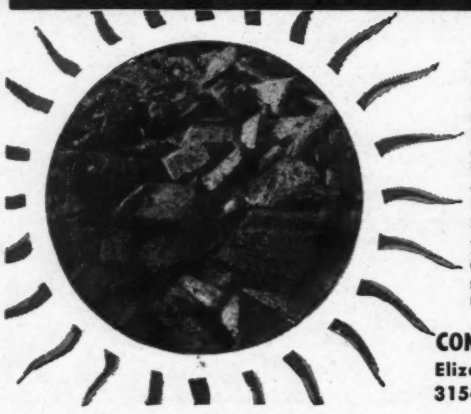
TRANSITE FLUE PIPE
For venting gas-burning appliances

CONNELLY IRON SPONGE



High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs.

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . there is no obligation on your part.

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Arkansas Louisiana Seeks To Operate War Built Lines

Robert W. Curran, general manager, Arkansas Louisiana Gas Co., says his company has applied to FPC for permission to operate the gas transmission lines constructed for war plant use from sour gas fields in south Arkansas, where the company's subsidiary, the Arkansas Fuel Oil Co., maintains a "sweetening" plant to extract sulphur from sour gas, to the aluminum and alumina plants erected for the Defense Plant Corp. at Jones Mills and Hurricane Creek.

Arkansas Louisiana seeks to convert these lines to private industrial use and to extend them to serve the expanding Little Rock industrial area.

Michigan Gas & Electric Reduces Gas Plant Accounts

Proposals of the Michigan Gas & Electric Co., Ashland, Wis., to make accounting adjustments involving the elimination of $466,675 from its electric and gas plant accounts, have been approved by the FPC. The amounts to be disposed of represent excesses of recorded cost over original cost, including common stock issued for franchises, writeups in connection with property acquisitions, and other items capitalized in error.

FPC Approves Canadian River Accounting Adjustment

Approval of Canadian River Gas Co.'s plan to make accounting adjustments involving the elimination of $3,757,022 from its gas plant account was announced March 4 by the Federal Power Commission. This amount represents writeups or other excesses over the original cost of the gas plant. The proposals, as approved, bring to a conclusion matters relating to the original cost of the gas plant which the Commission considered in connection with its order reducing Canadian River rates.

Consolidated Edison Co. Offers Informative Booklet

Consolidated Edison Co.'s 52-page booklet, "Serving New York", has been printed for company employees and for investors in Edison System securities. It describes in detail the company's operations and financial structure, as well as background information including the unique characteristics of New York City as a market for public utility services. The booklet was compiled by Sherman Hall, assistant director of the economic research department.

Shell Oil Co. Locates New California Gas Field

A new gas field has been located by Shell near Winters, Calif., 25 miles west of Sacramento and about 25 miles north of the Kirby Hill gas field. This new source was uncovered as the result of exploratory work conducted by the San Joaquin production division. Drilling operations were started Dec. 11, 1945, and on Feb. 6 the well was completed as a producer, flowing at the rate of 10 MMcf per day

Shelter Industries, Inc. To Build Fabricated Houses

Shelter Industries, Inc., is a new corporation formed Feb. 27 in New York to design, manufacture and distribute completely equipped factory fabricated houses. Erected prices to the owner will range from $4997 to $5891 according to Donald Deskey, industrial and architectural designer, and president of Shelter.

Production on the East Coast already has begun, and 200 houses per month soon will be available, or 26,000 during 1947. Deskey says the houses will be complete even down to such items as gas or electric kitchen ranges, cabinets, refrigerators, lighting fixtures, circulating warm air system, hot water heater, springs and mattresses and complete plumbing and wiring equipment. The quoted prices include all erection and foundation costs.

Primary aim of the company will be to fulfill the G. I. Home Building Program. There will be distribution centers throughout the country, and ultimate expansion will include the construction of $8000 and $10,000 models.

FPC Approves Rehearing Of Boone, Iowa Case

The Federal Power Commission has approved the petition of the Independent Natural Gas Association of America to intervene in the rehearing of the Northern Natural Gas Co. case in which FPC rejected the company's application to furnish boiler fuel gas to the Iowa Electric Light and Power Co. plant at Boone, Iowa, on the grounds that coal is available. Wesley E. Disney, INGA counsel, asserted that the Commission has applied the doctrine of "end use" control as a factor in denying a certificate to Northern Natural on the basis that other fuel is available for use in the area in question. He further states that nothing in the Natural Gas Act gives FPC jurisdiction to withhold a certificate on such ground.

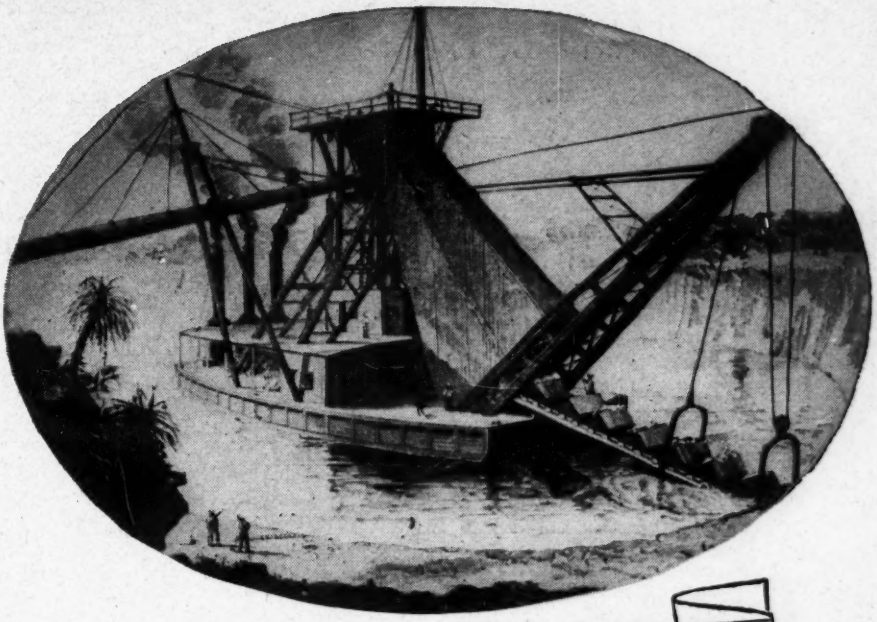
Texas Instrument Society Organized by Engineers

Control and measurement engineers in the Corpus Christi area have organized the South Texas Instrument Society and plan to affiliate their group with the new national organization, Instrument Society of America. Meetings are held monthly, and men interested in controlling and measurement equipment may obtain information regarding the organization from J. G. Pratt, 526 Villa Drive, Corpus Christi.

Fluor Corp., Ltd. Honored

The Fluor Corp., Ltd., Los Angeles, was among a number of firms and universities recently honored at a dinner in New York for work done on the atomic bomb project. Fluor constructed a substantial portion of the cooling towers at Oakridge, Tenn.

Also, at a recent convention of the Associated General Contractors of America, in Chicago, Fluor Corp. was awarded second place in the heavy construction division of the 1945 accident prevention contest.



Famous Facts

The Panama Canal, constructed with such huge dredges as this, was officially opened to commerce in August, 1915. Interest in this project had been active since 1850, and its completion was a major engineering triumph.

Bitumastic Enamel — introduced in the early 1850's — had a long record of excellent performance as a protective coating, and was applied to the lock gates and penstocks of the Panama Canal in 1912-14. Inspected in 1925, enamel and steel showed no deterioration from the corrosive waters of Gatun Lake.

Bitumastic Enamel's high viscosity provides a thick protective coating with good adhesion and great flexibility under stress, properties assuring maximum protection to oil, gas and gasoline lines. Impervious to water and chemicals present in highly corrosive soil, Bitumastic gives long-lasting corrosion protection under all conditions of soil and climate.

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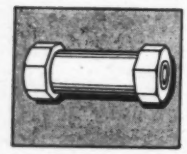
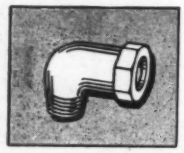
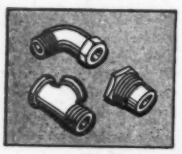
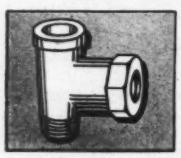
NORMAC COUPLINGS SLEEVES *AND* FITTINGS

for maximum deflection, ease of "stabbing," complete confinement of the rubber!









So close are "Normac" rubbers confined at the gasket tip that possibility of flow is reduced almost to "nil." These couplings, sleeves and fittings . . . approved by gas utility men across the country for their time-saving features, ease of handling and dependable service . . . are available in a complete range of sizes. Made from air furnace malleable iron they provide greater wall thickness than pipe on which used.

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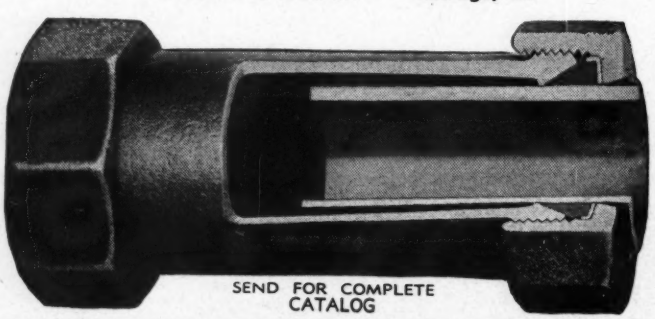
39 South La Salle St. Chicago, Ill.



SEND FOR COMPLETE CATALOG

Couplings - Meter Bars - Sleeves - Cocks - Bell Joint Clamps - Service Tees & Ells

Kansas City Gas Co. Has Custom Built Kitchen

The Kansas City Gas Co. has installed a custom built steel kitchen manufactured by the St. Charles Manufacturing Co., St. Charles, Ill., on the sales floor of the company's main office in Kansas City. It is the first of the post war St. Charles kitchens to be installed in this part of the country. Assembly of the kitchen was completed within one week.

All work tops and what-not shelves have been covered with ruby red linoleum for color tie-in. The floor covering is marbleized rubber type gray linoleum. Some of the modern, convenient features in the kitchen are tray storage unit, refuse receptacle, tilting flour bin, implement cabinet, towel drier, utensil cabinet, silver storage unit, sliding table, planning desk, pastry board, auxiliary storage rack, cutlery dividers, meat grinder attachment, step shelf, pull-out cutting board, cabinet mirror, sliding towel rack, and flourescent light.

B. C. Electric To Expand Vancouver Gas Plant

Construction of a new $600,000 addition to the Carrall Street gas plant of the British Columbia Electric Railway Co. Ltd., Vancouver, will be started during the latter part of March. Contract for the plant has been awarded to John Inglis Co. Ltd.

Peak capacity of the plant, expected to commence operation between Nov. 15 and Dec. 1, 1946, will be 4.5 MMcf daily and will increase daily capacity of the B. C. Electric Railway plant to 14 MMcf. Materials and equipment, which in former years had to be secured from British factories, will be purchased from Canadian manufacturers. Overhauling of existing gas-making facilities will be started once the new plant is completed.

Peoples Gas Light & Coke Revises Personnel Dept.

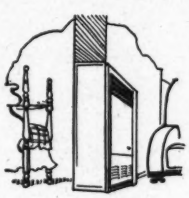
The name of the personnel department, Peoples Gas Light & Coke Co., Chicago, recently was changed to employee relations department. The employment and employee records were combined and will be known as the employment department. The heads of these departments will report to Leslie Brandt, assistant to the vice president. William Hollweg, assistant budget director, assumed general supervision over the activities of the budget department at the same time.

American Stove Plans New Administration Building

The American Stove Co., manufacturer of Magic Chef gas ranges, has incorporated many of the newest ideas of structural design in its projected administration building to be constructed in St. Louis, Arthur Stockstrom, president, has announced. This six-story building will centralize the principal offices and executive activities of the company at its new location on South Kingshighway Blvd. in St. Louis.

Another Member of the Hammel Line

DUAL WALL HEATER



The Hammel Dual Wall Heater featured here is but one of the Hammel family of dependable gas heating and ventilating units. Regardless of your heating needs, you are invited to consult a Hammel specialist. There's no charge or obligation.

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Complete details and specifications on the Dual Wall Heater or any unit in the Hammel line will be sent on request.

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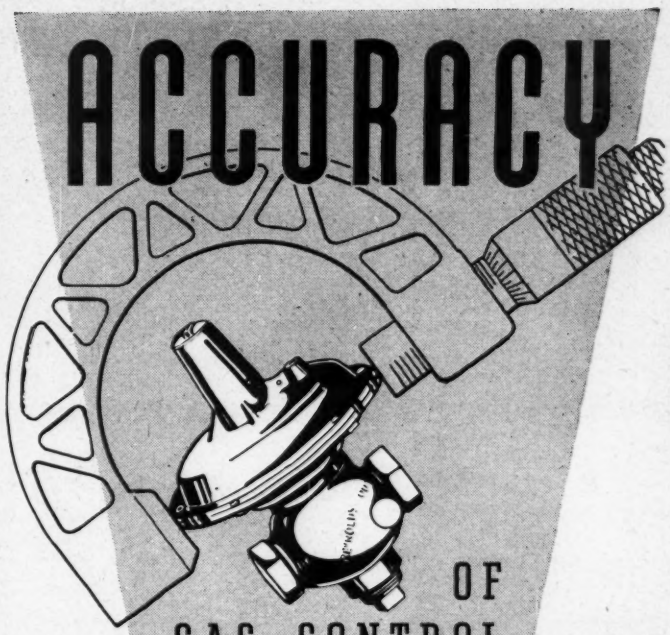

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STREET CITY ZONE STATE

Arkansas Western Gas Co. To Serve Berryville Area

The Berryville, Ark., city council recently granted a franchise to the Arkansas Western Gas Co., Fayetteville, Ark., to install a natural gas distribution system in Berryville. L. L. Baxter, president of the company; Thad Rowden, company engineer; and Clifton Wade, attorney, attended the council meeting. Baxter said the company plans to build a 6-in. pipe line to a point near Berryville and branches to serve Green Forest. Elpena, Harrison and Eureka Springs, Ark.

Shell Laboratories Expand

A. E. Lacomble', president of Shell Development Co., has announced that more than $3,5 million will be spent in expansion of Shell's research laboratories at Emeryville, Calif. Construction will begin this spring and continue over a two-year period.

Three major buildings will be constructed, and present facilities will be extensively remodeled. It will permit an increase in personnel from about 600 before the war to an anticipated 1200 when the building program is completed.

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